INDEX TO VOLUME 74

BIBLIOGRAPHY

Adams, C. J. *See* Eggers, A. J., 628-637
Aikas, O. *See* Rehtijarvi, P., 1102-1117
Al-Sulaimi, J. S. *See* Hassan, M. A., 919-924
Ambler, E. P. Alteration and mineralization associated with a vesicular dike near Yeoval in New South Wales, Australia: 67-76
Amoros, J. L. *See* Lunar, R., 751-762
Anderle, J. P.; Crosby, K. S.; and Waugh, D. C. E. Potash at Salt Springs, New Brunswick: 389-396
Anderson, S. B.; and Swinehart, R. P. Potash salts in the Williston Basin, U.S.A.: 358-376
Appel, P. W. U. Stratabound copper sulfides in a banded iron-formation and in basaltic tuffs in the early Precambrian Isua supracrustal belt, West Greenland: 45-52
Armbrustmacher, T. J. Replacement and primary magmatic carbonatites from the Wet Mountains area, Fremont and Custer counties, Colorado: 888-901
Armstrong, R. L.; Hollister, V. F.; and Harakal, J. E. K-Ar dates for mineralization in the White Cloud-Cannivan porphyry molybdenum belt of Idaho and Montana; reply [For discussion, see Schmidt, E. A., et al.]: 699
Ashley, R. P. *See* Hunt, G. R., 1613-1629
Avila Salinas, W. *See* Grant, J. N., 838-851
Bailey, D. G.; and Hodgson, C. J. Transported altered wall rock in laharic breccias at the Cariboo-Bell Cu-Au porphyry deposit, British Columbia: 125-128
Bailey, G. B. *See* O'Neil, J. R., 852-859
Barker, J. M.; Cochran, D. E.; and Semrad, R. Economic geology of the Mishraq native sulfur deposit, northern Iraq: 484-495
Barker, J. M. *See also* Lefond, S. J., 1883-1889
Barnes, H. L. *See* Giordano, T. H., 1637-1646
Bartholome, P. *See* Verkaeren, J., 53-66
Bethke, P. M.; and Rye, R. O. Environment of ore deposition in the Creede mining district, San Juan Mountains, Colorado; Part IV, Source of fluids, from oxygen, hydrogen, and carbon isotope studies [For reference to part 3, see Barton, P. B., Jr., et al, Econ. Geol., Vol. 72, p. 1, 1977]: 1832-1851
Bird, A. G. An epigenetic model for the formation of the Schwartzwalder uranium deposit; discussion [For reference to paper by Maslyn, R. M., see Econ. Geol., Vol. 73, No. 4, 1978]: 947-948
Bloxam, T. W. *See* Davies, T. C., 638-644
Bodenlos, A. J.; and Nelson, C. P. Sulfur: 459-461
Bostroem, K.; Rydell, H.; and Joensuu, O. Langban; an exhalative sedimentary deposit?: 1002-1011
Brecke, E. A. A hydrothermal system in the Midcontinent region: 1327-1335
Brimhall, G. H., Jr. Lithologic determination of mass transfer mechanisms of multiple-stage porphyry copper mineralization at Butte, Montana; vein formation by hypogene leaching and enrichment of potassium-silicate protore: 556-589
Bristol, C. C. Application of sphalerite geobarometry to ores from the Ruttan Mine: 1496-1503
Bronner, G.; and Chauvel, J. J. Precambrian banded iron-formations of the Ijil Group (Kediat Ijil, Reguibat Shield, Mauritania): 77-94
Button, A. Algal concentration in the Sabi River, Rhodesia; depositional model for Witwatersrand carbon: 1876-1882
Campbell, I. H.; and Naldrett, A. J. The influence of silicate:sulfide ratios on the geochemistry of magmatic sulfides: 1503-1506
Canney, F. C.; Cannon, H. L.; Cathrall, J. B.; and Robinson, K. Autumn colors, insects, plant disease, and prospecting: 1673-1676
Cannon, H. L. *See* Canney, F. C., 1673-1676
Carvalho, R. S. *See* Szatmari, P., 432-447
Cathrall, J. B. *See* Canney, F. C., 1673-1676
Chakrabarti, A. K.; and Durango M., J. Observations on a porphyry copper prospect in Choco, western Colombia: 1687-1692
Chao, T. T. *See* Hubert, A. E., 1669-1672
Chauvel, J. J. *See* Bronner, G., 77-94
Cheney, T. M.; McClellan, G. H.; and Montgomery, E. S. Sechura phosphate deposits, their stratigraphy, origin, and composition: 232-259
Chou, I. M. *See* Eugster, H. P., 763-774
Christofferson, H. C.; Wallin, B.; Selkman, S.; and Rickard, D. T. Mineralization controls in the sandstone lead-zinc deposits at Vassbo, Sweden: 1239-1249
Clark, A. H. Potassium-argon age of the Cerro Colorado porphyry copper deposit, Panama;; reply [For discussion, see Spatz, D. M.]: 695
Clark, A. H. *See also* McNutt, R. H., 827-837
Clark, A. H. *See also* Pearson, W. N., 1577-1599
Cloke, P. L.; and Kesler, S. E. The halite trend in hydrothermal solutions: 1823-1831
Cloke, P. L. *See also* Erwood, R. J., 95-108
Cochran, D. E. *See* Barker, J. M., 484-495
Cohen, L. H. *See* Grace, J. D., 689-692
Collins, P. L. F. Gas hydrates in CO_2-bearing fluid inclusions and the use of freezing data for estimation of salinity: 1435-1444
Cook, P. J.; and McElhinny, M. W. A reevaluation of the spatial and temporal distribution of sedimentary phosphate deposits in the light of plate tectonics: 315-330
Cordell, L. Gravity and aeromagnetic anomalies over basement structure in the Rolla Quadrangle and the southeast Missouri lead district: 1383-1394
Couston, J. F. *See* Kronberg, B. I., 1869-1875
Coveney, R. M., Jr. Sphalerite concentrations in Mid-Continent Pennsylvanian black shales of Missouri and Kansas: 131-140
Craig, J. R.; Vaughan, D. J.; and Higgins, J. B. Phase relations in the Cu-Co-S system and mineral associations of the carrollite ($CuCo_2S_4$)-linnaeite (Co_3S_4) series: 657-671
Craig, J. R. *See also* Henry, D. K., 645-656
Crocket, J. H. *See* Kuo, H. Y., 590-605
Crosby, A. *See* Smith, D. B., 397-408
Crosby, K. S. *See* Anderle, J. P., 389-396
Cumming, G. L.; Kesler, S. E.; and Krstic, D. Isotopic composition of lead in Mexican mineral deposits: 1395-1407
Damasco, F. V. *See* Fernandez, H. E., 606-627
Damasco, F. V. *See* Fernandez, H. E., 1852-1868
Davies, J. F.; and Luhta, L. E. An Archean "porphyry-type" disseminated copper deposit, Timmins, Ontario; a reply [For discussion, see Griffis, A. T.]: 697
Davies, T. C.; and Bloxam, T. W. Heavy metal distribution in laterites, southwest of Regent, Freetown igneous complex, Sierra Leone: 638-644
Davis, J. B.; and Kirkland, D. W. Bioepigenetic sulfur deposits: 462-468
Delevaux, M. H. *See* Doe, B. R., 1-26
Denyer C., P. *See* Kuypers, E. P., 672-678
DeWitt, E. New data concerning Proterozoic volcanic stratigraphy and structure in central Arizona and its importance in massive sulfide exploration: 1371-1382
Dissanayake, C. B. *See* Munasinghe, T., 1495-1496
Doe, B. R.; Steven, T. A.; Delevaux, M. H.; Stacey, J. S.; Lipman, P. W.; and Fisher, F. S. Genesis of ore deposits in the San Juan volcanic field, southwestern Colorado; lead isotope evidence: 1-26
Doe, B. R. *See also* Sverjensky, D. A., 149-153
Donnelly, T. H. *See* Knutson, J., 814-826
Donnelly, T. H. *See* Rickard, D. T., 1060-1068
Donnelly, T. H. *See* Rickard, D. T., 1255-1285
Drexler, J. W. *See* McKee, E. H., 928-930
Dunlap, J. C.; and Hite, R. J. Potash: 351-352
Durango M., J. *See* Chakrabarti, A. K., 1687-1692
Ebers, M. L.; and Kopp, O. C. Cathodoluminescent microstratigraphy in gangue dolomite, the Mascot-Jefferson City District, Tennessee: 908-918
Edwards, A. F. *See* Ruckmick, J. C., 469-474

Edwards, R. J. *See* Laznicka, P., 1352-1370
Eggers, A. J. Large-scale circular features in North Westland and West Nelson, New Zealand; possible structural control for porphyry molybdenum-copper mineralization?: 1490-1494
Eggers, A. J.; and Adams, C. J. Potassium-argon ages of molybdenum mineralization and associated granites at Bald Hill and correlation with other molybdenum occurrences in the South Island, New Zealand [N.Z., Inst. Nucl. Sci.; Contrib. No. 924]: 628-637
Erdosh, G. The Ontario carbonatite province and its phosphate potential: 331-338
Erwood, R. J.; Kesler, S. E.; and Cloke, P. L. Compositionally distinct, saline hydrothermal solutions, Naica Mine, Chihuahua, Mexico: 95-108
Eugster, H. P.; and Chou, I. M. A model for the deposition of Cornwall-type magnetite deposits: 763-774
Ewing, T. E. Lead isotope data from mineral deposits of southern New Mexico; a reinterpretation: 678-684
Eyzaguirre, V. R. *See* McKee, E. H., 928-930
Feiss, P. G. *See* Mason, D. R., 1506-1510
Ferguson, J. *See* Knutson, J., 814-826
Fernandez, H. E.; and Damasco, F. V. Gold deposition in the Baguio gold district and its relationship to regional geology: 1852-1868
Fernandez, H. E.; Damasco, F. V.; and Sangalang, L. A. Gold ore shoot development in the Antamok Mines, Philippines: 606-627
Filho, B. S. *See* Kronberg, B. I., 1869-1875
Finlow-Bates, T. Cyclicity in the lead-zinc-silver-bearing sediments at Mount Isa mine, Queensland, Australia, and rates of sulfide accumulation: 1408-1419
Finlow-Bates, T. Studies of the base metal sulfide deposits at McArthur River, Northern Territory, Australia; II, The sulfide-S and organic-C relationships of the concordant deposits and their significance; discussion [For reference to paper by Williams, N., see Econ. Geol., Vol. 73, p. 1036, 1978; for other discussion, see Scott, K. M., and Lambert, I. B.]: 1697-1699
Fisher, F. S. *See* Doe, B. R., 1-26
Fleet, M. E. Partitioning of Fe, Co, Ni, and Cu between sulfide liquid and basaltic melts and the composition of Ni-Cu sulfide deposits; discussion [For reference to paper by Rajamani, V., and Naldrett, A. J., see Econ. Geol., Vol. 73, p. 82, 1978]: 1517-1519
Floden, T.; Wallin, B.; Lans, H.; Sundin, G.; and Rickard, D. T. K:KART; a minicomputer program for two- and three dimensional representations of topographic and isopach maps: 1250-1254
Foerster, H.; and Knittel, U. Petrographic observations on a magnetite deposit at Mishdovan, central Iran: 1485-1489
Frietsch, R.; Papunen, H.; and Vokes, F. M. The ore deposits in Finland, Norway, and Sweden; a review: 975-1001
Frost, B. R. Metamorphism of iron-formation; parageneses in the system Fe-Si-C-O-H: 775-785
Fuller, A. O. Phosphate occurrences on the western and southern coastal areas and continental shelves of southern Africa: 221-231
Fuzesy, A. *See* Worsley, N., 377-388
Fyfe, W. S. *See* Kronberg, B. I., 1869-1875
Gaal, G.; and Isohanni, M. Characteristics of igneous intrusions and various wall rocks in some Precambrian porphyry copper-molybdenum deposits in Pohjanmaa, Finland: 1198-1210
Geis, H. P. Nepheline syenite on Stjernoey, northern Norway: 1286-1295
Geis, H. P. Structure control of stratiform sulfide deposits, with a new example from Sulitjelma; reply [For discussion, see Pouit, G.]: 1896-1897
Geyti, A.; and Schoenwandt, H. K. Bordvika; a possible porphyry molybdenum occurrence within the Oslo Rift, Norway: 1211-1220
Gilbert, M. C. *See* Henry, D. K., 645-656
Giordano, T. H.; and Barnes, H. L. Ore solution chemistry VI; PbS solubility in bisulfide solutions to 300°C [For reference to part 5, see Crerar, D. A., and Barnes, H. L., Econ. Geol., Vol. 71, p. 772, 1976]: 1637-1646
Girling, C. A.; Peterson, P. J.; and Warren, H. V. Plants as indicators of gold mineralization at Watson Bar, British Columbia, Canada: 902-907
Goldie, R.; Kotila, B.; and Seward, D. The Don Rouyn Mine; an Archean porphyry copper deposit near Noranda, Quebec: 1680-1684
Grace, J. D.; and Cohen, L. H. Effect of pressure on chalcocite phase transitions: 689-692
Grant, J. N.; Halls, C.; Avila Salinas, W.; and Snelling, N. J. K-Ar ages of igneous rocks and mineralization in part of the Bolivian tin belt: 838-851
Grant, M. A. Volatile and precious metal zoning in the Broadlands geothermal field, New Zealand; discussion [For reference to paper by Ewers, R. G., and Keays, R. R., see Econ. Geol., Vol. 72, p. 1337, 1977]: 702
Griffis, A. T. An Archean "porphyry-type" disseminated copper deposit, Timmins, Ontario; discussion [For reference to paper by Davies, J. F., and Luhta, L. E., see Econ. Geol., Vol. 73, p. 383, 1978]: 695-696
Grubb, P. L. C. Genesis of bauxite deposits in the lower Amazon Basin and Guianas coastal plain: 735-750
Gustafson, L. B. *See* Turner, J. S., 1895
Haapala, I.; and Kinnunen, K. Fluid inclusions in cassiterite and beryl in greisen veins in the Eurajoki Stock, southwestern Finland: 1231-1238
Hakli, T. A.; Vormisto, K.; and Hanninen, E. Vammala, a nickel deposit in layered ultramafite, southwest Finland: 1166-1182
Hakli, T. A. *See also* Himmi, R., 1183-1197
Halls, C. *See* Grant, J. N., 838-851
Halpern, M. Strontium isotope compositions of rocks from the Disputada copper mine, Chile: 129-130
Hanninen, E. *See* Hakli, T. A., 1166-1182
Harakal, J. E. *See* Armstrong, R. L., 699
Harley, D. N. A mineralized Ordovician resurgent caldera complex in the Bathurst-Newcastle mining district, New Brunswick, Canada: 786-796
Hassan, M. A.; and Al-Sulaimi, J. S. Copper mineralization in the northern part of Oman Mountains near Al Fujairah, United Arab Emirates: 919-924
Hattori, K.; and Sakai, H. D/H ratios, origins, and evolution of the ore-forming fluids for the Neogene veins and kuroko deposits of Japan: 535-555
Haynes, S. J.; and Mostaghel, M. A. Formation temperature of fluorite in the Lockport Dolomite in upper New York State as indicated by fluid inclusion studies; with discussion of heat sources; discussion [With reply; reference to paper by Kinsland, G. L., see Econ. Geol., Vol. 72, p. 849, 1977]: 154-159
Helovuori, O. Geology of the Pyhasalmi ore deposit, Finland: 1084-1101
Henley, R. W.; and Thornley, P. Some geothermal aspects of polymetallic massive sulfide formation: 1600-1612
Henry, D. K.; Craig, J. R.; and Gilbert, M. C. Ore mineralogy of the Great Gossan Lead, Virginia [IGCP Proj. 60; Contrib.]: 645-656
Higgins, J. B. *See* Craig, J. R., 657-671
Himmi, R.; Huhma, M.; and Hakli, T. A. Mineralogy and metal distribution in the copper-tungsten deposit at Ylojarvi, southwest Finland: 1183-1197
Hite, R. J.; and Japakasetr, T. Potash deposits of the Khorat Plateau, Thailand and Laos: 448-458
Hite, R. J. *See also* Dunlap, J. C., 351-352
Hoagland, A. D. Geology of the Bayhorse fluorite deposit, Custer County, Idaho; discussion [For reference to paper by Snyder, K. D., see Econ. Geol., Vol. 73, p. 207, 1978]: 164-165
Hodgson, C. J. *See* Bailey, D. G., 125-128
Hogg, G. M. *See* Robertson, D. S., 1702
Holland, H. D. Metals in black shales; a reassessment: 1676-1680
Holland, H. D. *See also* Tsui, T. F., 1647-1653
Hollister, V. F. *See* Armstrong, R. L., 699
Hough, M. J. *See* Howard, P. F., 260-284
Howard, P. F. Phosphate: 192-194
Howard, P. F.; and Hough, M. J. On the geochemistry and origin of the D Tree, Wonarah, and Sherrin Creek phosphorite deposits of the Georgina Basin, northern Australia: 260-284
Hubert, A. E.; and Chao, T. T. Multielement analysis of natural waters for hydrogeochemical prospecting by X-ray fluorescence following preconcentration and filter deposition: 1669-1672
Huhma, M. *See* Himmi, R., 1183-1197

Huhtala, T. The geology and zinc-copper deposits of the Pyhasalmi-Pielavesi District, Finland: 1069-1083
Hunt, G. R.; and Ashley, R. P. Spectra of altered rocks in the visible and near infrared: 1613-1629
Inkinen, O. Copper, zinc, and uranium occurrences at Pahtavuoma in the Kittila greenstone complex, northern Finland: 1153-1165
Isohanni, M. *See* Gaal, G., 1198-1210
Jacobs, D. C.; and Parry, W. T. Geochemistry of biotite in the Santa Rita porphyry copper deposit, New Mexico: 860-887
Japakasetr, T. *See* Hite, R. J., 448-458
Joensuu, O. *See* Bostroem, K., 1002-1011
Jones, H. The flow of hot saline solution from vents in the sea floor; some implications for exhalative massive sulfide and other ore deposits; discussion [For reference to paper by Turner, J. S., and Gustafson, L. B., see Econ. Geol., Vol. 73, p. 1082, 1978]: 1894
Keller, W. D. Bauxitization of syenite and diabase illustrated in scanning electron micrographs: 116-124
Kelly, W. C.; and Rye, R. O. Geologic, fluid inclusion, and stable isotope studies of the tin-tungsten deposits of Panasqueira, Portugal: 1721-1822
Kesler, S. E. *See* Cloke, P. L., 1823-1831
Kesler, S. E. *See* Cumming, G. L., 1395-1407
Kesler, S. E. *See* Erwood, R. J., 95-108
Kieft, C. *See* Oen, I. S., 1630-1636
Kinnunen, K. *See* Haapala, I., 1231-1238
Kinsland, G. L. Formation temperature of fluorite in the Lockport Dolomite in upper New York State as indicated by fluid inclusion studies; with discussion of heat sources; reply [For discussion, see Haynes, S. J., and Mostaghel, M. A.]: 159-164
Kirkland, D. W. *See* Davis, J. B., 462-468
Knapp, R. B. *See* Norton, D., 1513-1517
Knittel, U. *See* Foerster, H., 1485-1489
Knutson, J.; Ferguson, J.; Roberts, W. M. B.; Donnelly, T. H.; and Lambert, I. B. Petrogenesis of the copper-bearing breccia pipes, Redbank, Northern Territory, Australia: 814-826
Konnerup-Madsen, J. Fluid inclusions associated with a metamorphosed molybdenite mineralization in Vest-Agder, south Norway: 1221-1230
Kopp, O. C. *See* Ebers, M. L., 908-918
Kotila, B. *See* Goldie, R., 1680-1684
Kronberg, B. I.; Couston, J. F.; Filho, B. S.; Fyfe, W. S.; Nash, R. A.; and Sugden, D. Minor element geochemistry of the Paragominas bauxite, Brazil: 1869-1875
Krstic, D. *See* Cumming, G. L., 1395-1407
Kubica, B. *See* Pawlowski, S., 475-483
Kuo, H. Y.; and Crocket, J. H. Rare earth elements in the Sudbury Nickel Irruptive; comparison with layered gabbros and implications for nickel irruptive petrogenesis: 590-605
Kuypers, E. P.; and Denyer C., P. Volcanic exhalative manganese deposits of the Nicoya ophiolite complex, Costa Rica: 672-678
Laing, W. P.; Marjoribanks, R. W.; and Rutland, R. W. R. Structure of the Broken Hill Mine area and its significance for the genesis of the orebodies; reply [For discussion, see Stanton, R. L.]: 1892-1894
Lambert, I. B. *See* Knutson, J., 814-826
Lambert, I. B. *See* Scott, K. M., 1693-1694
Lang, B. The base metals-gold hydrothermal ore deposits of Baia Mare, Romania: 1336-1351
Lans, H. *See* Floden, T., 1250-1254
Latvalahti, U. Cu-Zn-Pb ores in the Aijala-Orijarvi area, southwest Finland: 1035-1059
Laznicka, P.; and Edwards, R. J. Dolores Creek, Yukon; a disseminated copper mineralization in sodic metasomatites: 1352-1370
Leach, D. L. Temperature and salinity of the fluids responsible for minor occurrences of sphalerite in the Ozark region of Missouri: 931-937
Lefond, S. J.; and Barker, J. M. A borate and zeolite occurrence near Magdalena, Sonora, Mexico: 1883-1889
Lindroos, H.; and Smellie, J. A. T. A stratabound uranium occurrence within middle Precambrian ignimbrites at Duobblon, northern Sweden: 1118-1130
Lipman, P. W. *See* Doe, B. R., 1-26
Ludwig, K. R. Age of uranium mineralization in the Gas Hills and Crooks Gap districts, Wyoming, as indicated by U-Pb isotope apparent ages: 1654-1668
Luhta, L. E. *See* Davies, J. F., 697
Lunar, R.; and Amoros, J. L. Mineralogy of the oolitic iron deposits of the Ponferrada-Astorga Zone, northwestern Spain: 751-762
Lundberg, B.; and Smellie, J. Painirova and Mertainen iron ores; two deposits of the Kiruna iron ore type in northern Sweden: 1131-1152
Makela, M. *See* Rehtijarvi, P., 1102-1117
Marinder, N. E. *See* Rickard, D. T., 1255-1285
Marjoribanks, R. W. *See* Laing, W. P., 1892-1894
Marshall, B. The lineament-ore association: 942-946
Mason, D. R.; and Feiss, P. G. On the relationship between whole rock chemistry and porphyry copper mineralization: 1506-1510
McClellan, G. H. *See* Cheney, T. M., 232-259
McDonald, J. A. Sourcelines, sourceregions, and pathlines for fluids in hydrothermal systems related to cooling plutons; discussion [For reference to paper by Norton, D., see Econ. Geol., Vol. 73, p. 21, 1978]: 1511-1513
McElhinny, M. W. *See* Cook, P. J., 315-330
McKee, E. H.; Noble, D. C.; Scherkenbach, D. A.; Drexler, J. W.; Mendoza, J.; and Eyzaguirre, V. R. Age of porphyry intrusion, potassic alteration, and related skarn mineralization, Antamina District, northern Peru: 928-930
McLeod, M. J. Paleoclimatic control and stratigraphic limits of synsedimentary mineral occurrences in Mississippian-Early Pennsylvanian strata of eastern Canada; discussion [For reference to paper by van de Poll, H. W., see Econ. Geol., Vol. 73, p. 1069, 1978]: 1529-1530
McNutt, R. H.; Clark, A. H.; and Zentilli, M. Lead isotopic compositions of Andean igneous rocks, latitudes 26° to 29° S; petrologic and metallogenic implications: 827-837
McQueen, K. G. Experimental heating and diffusion effects in Fe-Ni sulfide ore from Redross, Western Australia: 140-148
Mehliss, A. T. M. The time-bound character of uranium deposits; discussion [For reference to paper by Robertson, D. S., et al., see Econ. Geol., Vol. 73, p. 1409, 1978]: 1702
Mendoza, J. *See* McKee, E. H., 928-930
Montgomery, E. S. *See* Cheney, T. M., 232-259
Morel, S. W. The geology and mineral resources of Sierra Leone: 1563-1576
Mostaghel, M. A. *See* Haynes, S. J., 154-159
Muessig, S. The art of exploration [Presidential address]: 732-734
Munasinghe, T.; and Dissanayake, C. B. Is the Highland-eastern Vijayan boundary in Sri Lanka a possible mineralized belt?: 1495-1496
Naldrett, A. J. Partitioning of Fe, Co, Ni, and Cu between sulfide liquid and basaltic melts and the composition of Ni-Cu sulfide deposits; reply and further discussion [For discussion, see Fleet, M. E.]: 1520-1528
Naldrett, A. J. *See also* Campbell, I. H., 1503-1506
Nash, R. A. *See* Kronberg, B. I., 1869-1875
Nelson, C. P. *See* Bodenlos, A. J., 459-461
Noble, D. C. *See* McKee, E. H., 928-930
Norton, D.; Knapp, R. B.; and Villas, R. N. V. Sourcelines, sourceregions, and pathlines for fluids in hydrothermal systems related to cooling plutons; reply [For discussion, see McDonald, J. A.]: 1513-1517
Notholt, A. J. G. The economic geology and development of igneous phosphate deposits in Europe and the USSR: 339-350
Oen, I. S.; Kieft, C.; and Westerhof, A. B. Variation in composition of chromites from chromite-arsenide deposits in the peridotites of Malaga, Spain: 1630-1636
Ohlsson, L. G. Tungsten occurrences in central Sweden: 1012-1034
O'Neil, J. R.; and Bailey, G. B. Stable isotope investigation of gold-bearing jasperoid in the central Drum Mountains, Utah: 852-859
O'Neil, J. R. *See also* Sawkins, F. J., 1420-1434
Paarma, H. *See* Vartiainen, H., 1296-1306
Papunen, H. *See* Frietsch, R., 975-1001
Parry, W. T. *See* Jacobs, D. C., 860-887

Pawlowska, K. *See* Pawlowski, S., 475-483
Pawlowski, S.; Pawlowska, K.; and Kubica, B. Geology and genesis of the Polish sulfur deposits: 475-483
Pearson, W. N.; and Clark, A. H. The Minto copper deposit, Yukon Territory; a metamorphosed orebody in the Yukon crystalline terrane: 1577-1599
Peterman, Z. E. Geochronology and the Archean of the United States [SEG distinguished lecture in scientific research]: 1544-1562
Peterson, P. J. *See* Girling, C. A., 902-907
van de Poll, H. W. Paleoclimatic control and stratigraphic limits of syn-sedimentary mineral occurrences in Mississippian-Early Pennsylvanian strata of eastern Canada; reply: 1530-1531
Pouit, G. Structural control of stratiform deposits with a new example from Sulitjelma; discussion [For reference to paper by Geis, H. P., see Econ. Geol., Vol. 73, p. 1161, 1978]: 1895-1896
Price, F. T.; and Shieh, Y. N. The distribution and isotopic composition of sulfur in coals from the Illinois Basin: 1445-1461
Rehtijarvi, P.; Aikas, O.; and Makela, M. A middle Precambrian uranium- and apatite-bearing horizon associated with the Vihanti zinc ore deposit, western Finland: 1102-1117
Rickard, D. T.; Willden, M. Y.; Marinder, N. E.; and Donnelly, T. H. Studies on the genesis of the Laisvall sandstone lead-zinc deposit, Sweden: 1255-1285
Rickard, D. T.; Zweifel, H.; and Donnelly, T. H. Sulfur isotope systematics in the Aasen pyrite-barite deposits, Skellefte District, Sweden: 1060-1068
Rickard, D. T. *See also* Christofferson, H. C., 1239-1249
Rickard, D. T. *See also* Floden, T., 1250-1254
Riggs, S. R. Petrology of the Tertiary phosphorite system of Florida: 195-220
Riggs, S. R. Phosphorite sedimentation in Florida; a model phosphogenic system: 285-314
Ringler, R. W. Sphalerite geobarometry of the Calloway Mine, Ducktown, Tennessee: 937-942
Rittenhouse, P. A. Potash and politics: 353-357
Roberts, W. M. B. *See* Knutson, J., 814-826
Robertson, D. S.; Tilsley, J. E.; and Hogg, G. M. The time-bound character of uranium deposits; reply [For discussion, see Mehliss, A. T. M.]: 1702
Robinson, K. *See* Canney, F. C., 1673-1676
Ruckmick, J. C.; Wimberly, B. H.; and Edwards, A. F. Classification and genesis of biogenic sulfur deposits: 469-474
de Ruiter, P. A. C. The Gabon and Congo basins salt deposits: 419-431
Rutland, R. W. R. *See* Laing, W. P., 1892-1894
Ryall, W. R. Mercury distribution in the Woodlawn massive sulfide deposit, New South Wales: 1471-1484
Rydell, H. *See* Bostroem, K., 1002-1011
Rye, D. M. *See* Sverjensky, D. A., 149-153
Rye, R. O. *See* Bethke, P. M., 1832-1851
Rye, R. O. *See* Kelly, W. C., 1721-1822
Rye, R. O. *See* Sawkins, F. J., 684-689
Sakai, H. *See* Hattori, K., 535-555
Sangalang, L. A. *See* Fernandez, H. E., 606-627
Sawkins, F. J. Fluid inclusion studies of the Inguaran copper-bearing breccia pipes, Michaocan, Mexico: 924-927
Sawkins, F. J.; O'Neil, J. R.; and Thompson, J. M. Fluid inclusion and geochemical studies of vein gold deposits, Baguio District, Philippines: 1420-1434
Sawkins, F. J.; and Rye, R. O. Additional geochemical data on the Messina copper deposits, Transvaal, South Africa: 684-689
Scherkenbach, D. A. *See* McKee, E. H., 928-930
Schmidt, E. A.; Worthington, J. E.; and Thomssen, R. W. K-Ar dates for mineralization in the White Cloud-Cannivan porphyry molybdenum belt of Idaho and Montana; discussion [For reference to paper by Armstrong, R. L., et al., see Econ. Geol., Vol. 73, p. 94, 1978]: 698-699
Schmoker, J. W. Interpretation of borehole gravity surveys in a native-sulfur deposit, Culberson County, Texas: 1462-1470
Schoenwandt, H. K. *See* Geyti, A., 1211-1220
Scott, K. M.; and Lambert, I. B. Studies of the base metal sulfide deposits at McArthur River, Northern Territory, Australia; II, The sulfide-S and organic-C relationships of the concordant deposits and their significance; discussion [For reference to paper by Williams, N., see Econ. Geol., Vol. 73, p. 1036, 1978; for other discussion, see Finlow-Bates, T.]: 1693-1694
Selkman, S. *See* Christofferson, H. C., 1239-1249
Semrad, R. *See* Barker, J. M., 484-495
Seward, D. *See* Goldie, R., 1680-1684
Sharp, J. E. Cave Peak, a molybdenum-mineralized breccia pipe complex in Culberson County, Texas: 517-534
Shieh, Y. N. *See* Price, F. T., 1445-1461
Simoes, I. A. *See* Szatmari, P., 432-447
Skinner, B. J. An issue devoted to phosphate, potash, and sulfur; Preface: 191
Smellie, J. *See* Lundberg, B., 1131-1152
Smellie, J. A. T. *See* Lindroos, H., 1118-1130
Smith, D. B.; and Crosby, A. The regional and stratigraphical context of Zechstein 3 and 4 potash deposits in the British sector of the southern North Sea and adjoining land areas: 397-408
Snelling, N. J. *See* Grant, J. N., 838-851
Solomon, M.; and Walshe, J. L. The formation of massive sulfide deposits on the sea floor: 797-813
Sondergeld, C. H.; and Turcotte, D. L. A laboratory study of mineral deposition in a boiling environment: 109-115
Spatz, D. M. Potassium-argon age of the Cerro Colorado porphyry copper deposit, Panama; discussion [For reference to paper by Clark, A. H., et al., see Econ. Geol., Vol. 72, p. 1154, 1977]: 693-695
Stacey, J. S. *See* Doe, B. R., 1-26
Stanton, R. L. Structure of the Broken Hill Mine area and its significance for the genesis of the orebodies; discussion [For reference to paper by Laing, W. P., et al., see Econ. Geol., Vol. 73, p. 1112, 1978]: 1890-1892
Steven, T. A. *See* Doe, B. R., 1-26
Sugden, D. *See* Kronberg, B. I., 1869-1875
Sundin, G. *See* Floden, T., 1250-1254
Sverjensky, D. A.; Rye, D. M.; and Doe, B. R. The lead and sulfur isotopic compositions of galena from a mississippi valley-type deposit in the New Lead Belt, Southeast Missouri: 149-153
Swinehart, R. P. *See* Anderson, S. B., 358-376
Szatmari, P.; Carvalho, R. S.; and Simoes, I. A. A comparison of evaporite facies in the late Paleozoic Amazon and the Middle Cretaceous South Atlantic salt basins: 432-447
Thompson, J. M. *See* Sawkins, F. J., 1420-1434
Thomssen, R. W. *See* Schmidt, E. A., 698-699
Thornley, P. *See* Henley, R. W., 1600-1612
Thorpe, R. I. A sedimentary barite deposit from the Archean Fig Tree Group of the Barberton Mountain Land (South Africa); discussion [For reference to paper by Heinrichs, T. K., and Reimer, T. O., see Econ. Geol., Vol. 72, p. 1426, 1977]: 700-702
Tilsley, J. E. *See* Robertson, D. S., 1702
Trace, R. D. Exploration for fluorspar vein deposits in western Kentucky: 1684-1687
Tsui, T. F.; and Holland, H. D. The analysis of fluid inclusions by laser microprobe: 1647-1653
Turcotte, D. L. *See* Sondergeld, C. H., 109-115
Turner, J. S.; and Gustafson, L. B. The flow of hot saline solutions from vents in the sea floor; some implications for exhalative massive sulfide and other ore deposits; reply [For discussion, see Jones, H.]: 1895
Utter, T. The morphology and silver content of gold from the Upper Witwatersrand and Ventersdorp Systems of the Klerksdorp gold field, South Africa: 27-44
Vartiainen, H.; and Paarma, H. Geological characteristics of the Sokli carbonatite complex, Finland: 1296-1306
Vaughan, D. J. *See* Craig, J. R., 657-671
Verkaeren, J.; and Bartholome, P. Petrology of the San Leone magnetite skarn deposit (S.W. Sardinia): 53-66
Villas, R. N. V. *See* Norton, D., 1513-1517
Vokes, F. M. *See* Frietsch, R., 975-1001
Vormisto, K. *See* Hakli, T. A., 1166-1182
Wallin, B. *See* Christofferson, H. C., 1239-1249
Wallin, B. *See* Floden, T., 1250-1254
Walshe, J. L. *See* Solomon, M., 797-813
Warren, H. V. *See* Girling, C. A., 902-907
Waugh, D. C. E. *See* Anderle, J. P., 389-396
Westerhof, A. B. *See* Oen, I. S., 1630-1636
Widenfalk, L. Mercury as an indicator of stratigraphy and metamorphism in the Skellefte ore district: 1307-1314
Willden, M. Y. *See* Rickard, D. T., 1255-1285

Williams, N. Studies of the base metal sulfide deposits at McArthur River, Northern Territory, Australia; II, The sulfide-S and organic-C relationships of the concordant deposits and their significance; reply [For discussion, see Scott, K. M., and Lambert, I. B.]: 1695-1697
Williams, N. Studies of the base metal sulfide deposits at McArthur River, Northern Territory, Australia, II, The sulfide-S and organic-C relationships of the concordant deposits and their significance; reply [For discussion, see Finlow-Bates, T.]: 1699-1702
Wimberly, B. H. *See* Ruckmick, J. C., 469-474
Woods, P. J. E. The geology of Boulby Mine: 409-418
Worsley, N.; and Fuzesy, A. The potash-bearing members of the Devonian Prairie Evaporite of southeastern Saskatchewan, south of the mining area: 377-388
Worthington, J. E. *See* Schmidt, E. A., 698-699
Zentilli, M. *See* McNutt, R. H., 827-837
Zweifel, H. *See* Rickard, D. T., 1060-1068

INDEX TO VOLUME 74

SUBJECT INDEX

Absolute age *See* Radiometric age
Africa, *deposits*
phosphate, southern, coastal, review
Fuller, A. O., 221
Algae
distribution, stream cf. auriferous conglomerate
Button, A., 1876
Aluminum, *geochemistry See* Bauxite, geochemistry
Andes, *geochemistry*
central, igneous rocks, lead isotopes
McNutt, R. H., 827
Arizona, *deposits*
copper, central, stratigraphic guides
DeWitt, E., 1371
Arkansas, *geochemistry*
bauxite, genesis
Keller, W. D., 116
Australia, *deposits*
barite, sedimentary, Archean
Thorpe, R. I., 700
Automatic data processing
cartography, minicomputer program
Floden, T., 1250
Barite, *deposits*
Mississippi Valley, regional zoning
Brecke, E. A., 1327
South Africa, Rhodesia, Australia, sedimentary, Archean
Thorpe, R. I., 700
Sweden, Asen, strata-bound, sulfur isotopes
Rickard, D. T., 1060
Base metals, *deposits*
Andes, igneous source rocks, lead isotopes
McNutt, R. H., 827
New Mexico, southern, lead isotopes
Ewing, T. E., 678
Base metals, *deposits.*
(*See also* Kuroko deposits; Polymetallic ores; Strata-bound deposits)
Base metals-silver, *deposits*
Mexico, Naica, ore-forming fluids
Erwood, R. J., 95
Base metals-silver, *deposits.*
(*See also* Polymetallic ores; Stratabound deposits)
Bauxite, *deposits*
Guianas, Brazil, complex origin
Grubb, P. L. C., 735
Sierra Leone, Mokanji Hills
Morel, S. W., 1563
Bauxite, *geochemistry*
genesis, stages, SEM textural study
Keller, W. D., 116
trace elements, profile
Kronberg, B. I., 1869
Biogeochemical processes *See* Geochemical prospecting, plant materials; Geochemistry, biological processes
Biogeochemistry *See* Geochemistry, biological processes
Biological processes *See* Geochemistry
Bolivia, *deposits*
tin-tungsten, K/Ar ages
Grant, J. N., 838
Borates, *deposits*
Mexico, Magdalena
Lefond, S. J., 1883
Thailand, Laos, potash deposits
Hite, R. J., 448
Brazil, *deposits*
bauxite, complex origin
Grubb, P. L. C., 735
potash, Amazon Basin, Sergipe embayment
Szatmari, P., 432
Brazil, *geochemistry*
bauxite, Paragominas, trace elements
Kronberg, B. I., 1869
Breccia, *intrusive*
dikes, sills, Yukon Territory, Dolores Creek
Laznicka, P., 1352
dikes, tourmaline, copper-tungsten deposit, Finland
Himmi, R., 1183
pipes, Mexico, copper, fluid inclusions
Sawkins, F. J., 924
pipes, Northern Territory, Redbank, copper
Knutson, J., 814
pipes, Texas, molybdenum
Sharp, J. E., 517
Breccia, *volcanic*
altered clasts, ore guide, porphyry copper
Bailey, D. G., 125
Brines *See* Ore-forming fluids; Thermal waters
British Columbia, *deposits*
copper-gold, porphyry, Caribou Bell
Bailey, D. G., 125
British Columbia, *geochemistry*
Watson Bar, gold, geochemical prospecting
Girling, C. A., 902
Bromine, *geochemistry*
evaporites, potash guide
Hite, R. J., 448
Canada, *geochemistry*
general, radiometric ages, Archean
Peterman, Z. E., 1544
Carbon, *geochemistry*
sulfur-carbon ratios, strata-bound deposit, interpretation
Scott, K. M., 1693
Williams, N., 1695
Finlow-Bates, T., 1697
Williams, N., 1699
Carbon, *geochemistry.*
(*See also* Geochemistry, biological processes; Isotopes; Organic materials)
Chemical analysis, *methods*
X-ray fluorescence, metals
Hubert, A. E., 1669
Chemical zoning *See* Mineral zoning
Chile, *deposits*
copper, Disputada mine, strontium isotopes
Halpern, M., 129
Chromite, *deposits*
Spain, Malaga, geochemistry
Oen, I. S., 1630
Coal, *geochemistry*
sulfur, sources, incorporation
Price, F. T., 1445
Cobalt, *deposits*
Yukon Territory, Dolores Creek
Laznicka, P., 1352
Cobalt, *geochemistry*
partitioning, sulfide liquid, basalt melts
Fleet, M. E., 1517
Naldrett, A. J., 1520
Colombia, *deposits*
copper, porphyry, Choco
Chakrabarti, A. K., 1687
Colorado, *deposits*
polymetallic ores, San Juans, lead isotopes
Doe, B. R., 1
rare earths, carbonatites, Wet Mountains
Armbrustmacher, T. J., 888
uranium, Schwartzwalder mine, genesis
Bird, A. G., 947
Colorado, *geochemistry*
Creede, isotopes
Bethke, P. M., 1832
Congo, *deposits*
potash, stratigraphy, genesis
de Ruiter, P. A. C., 419
Contact-metamorphic deposits *See* Skarn; Metamorphism, contact
Copper, *deposits*
Arizona, volcanic stratigraphy
DeWitt, E., 1371
Chile, Disputada mine, strontium isotopes
Halpern, M., 129
Finland, Ylojarvi, mineralogy, geochemistry
Himmi, R., 1183
Mexico, breccia pipes, fluid inclusions
Sawkins, F. J., 924
Northern Territory, Redbank, breccia pipes
Knutson, J., 814
Ontario, Timmins, genesis
Griffis, A. T., 695
Davies, J. F., 697
Philippines, Baguio
Fernandez, H. E., 1852
South Africa, Messina, isotopes, fluid inclusions
Sawkins, F. J., 684
Tennessee, Ducktown, sphalerite geobarometry
Ringler, R. W., 937
United Arab Emirates, Oman Mountains
Hassan, M. A., 919
Yukon Territory, Dolores Creek, metasomatism
Laznicka, P., 1352

Yukon Territory, Minto, metamorphosed
Pearson, W. N., 1577
Copper, *geochemistry*
partitioning, silicate melt vs. crystalline phases
Mason, D. R., 1506
partitioning, sulfide liquid, basalt melts
Fleet, M. E., 1517
Naldrett, A. J., 1520
precipitation, copper sulfate, experimental study
Sondergeld, C. H., 109
solubility, chloride solutions
Tsui, T. F., 1647
Copper, *deposits.*
(*See also* Base metals; Polymetallic ores; Porphyry copper; Strata-bound deposits)
Copper, *geochemistry.*
(*See also* Base metals, geochemistry; Phase equilibria)
Copper-nickel, *deposits*
Finland, Vammala, ultramafic host
Hakli, T. A., 1166
Costa Rica, *deposits*
manganese, Nicoya ophiolite, volcanogenesis
Kuypers, E. P., 672
Crust, *evolution*
Archean, United States, radiometric ages
Peterman, Z. E., 1544
Crust, *structure*
Colorado, San Juans, ore-lead derivation
Doe, B. R., 1
Crust, *composition.*
(*See also* Mantle)
Crystal chemistry
lead-sulfide complexes, stabilities
Giordano, T. H., 1637
Crystal chemistry.
(*See also* Phase equilibria)
Crystal growth
dolomite, microstratigraphy, detection
Ebers, M. L., 908
Cyprus, *deposits*
base metals, submarine effusion, model
Solomon, M., 797
Deformation, *field studies*
compaction, thrust-sheet loading
Rickard, D. T., 1255
flowage, evaporites
Anderle, J. P., 389
Woods, P. J. E., 409
silicate cataclasis vs. sulfide flow
Pearson, W. N., 1577
Diagenesis
lead-zinc, Sweden, paleohydrology
Rickard, D. T., 1255
phosphate, Australia, northern
Howard, P. F., 260
phosphate, Florida
Riggs, S. R., 195
potash, England, Zechstein
Woods, P. J. E., 409
sulfides, strata-bound base-metal deposit
Scott, K. M., 1693
Williams, N., 1695
Finlow-Bates, T., 1697
Williams, N., 1699
Diamonds, *deposits*
Sierra Leone, placer, sources
Morel, S. W., 1563
Economic geology, *practice, deposit evaluation*
sulfur, borehole gravity surveys
Schmoker, J. W., 1462
Economic geology, *practice, exploration*
Fennoscandia, review
Frietsch, R., 975
success, ingredients
Muessig, S., 732
Economic geology, *practice, miscellaneous*
minicomputer cartographic program
Floden, T., 1250
potash, political considerations
Rittenhouse, P. A., 353
Economic geology, *practice, exploration.*
(*See also* Mineral exploration)
Economic geology, *resources See* Mineral resources
England, *deposits*
potash, Boulby mine, stratigraphy, deformation
Woods, P. J. E., 409
potash, northeast, stratigraphy
Smith, D. B., 397
Europe, *deposits*
Phosphates, igneous, review
Notholt, A. J. G., 339
Finland, *deposits*
base metals, Aijala-Orijarvi, massive sulfide
Latvalahti, U., 1035
copper-molybdenum, porphyry, Pohjanmaa
Gaal, G., 1198
copper-nickel, Vammala
Hakli, T. A., 1166
copper-tungsten, Ylojarvi
Himmi, R., 1183
copper-zinc, Pyhasalmi
Helovuori, O., 1084
copper-zinc, Pyhasalmi-Pielavesi
Huhtala, T., 1069
copper-zinc-uranium, Pahtavuoma
Inkinen, O., 1153
general, review
Frietsch, R., 975
niobium, phosphates, iron, Sokli carbonatite
Vartiainen, H., 1296
uranium-phosphate, Vihanti, Precambrian
Rehtijarvi, P., 1102
Finland, *geochemistry*
Eurajoki, tin greisen, fluid inclusions
Haapala, I., 1231
Florida, *deposits*
phosphate, sedimentation, model
Riggs, S. R., 285
phosphates, types, petrology, genesis
Riggs, S. R., 195
Fluid inclusions, *composition*
Colorado, Creede
Bethke, P. M., 1832
general, halite trend, reactions
Cloke, P. L., 1823
Mexico, Naica, skarn
Ewood, R. J., 95
Norway, Flottorp, strata-bound molybdenum
Konnerup-Madsen, J., 1221
Philippines, Baguio, chemical, isotopes
Sawkins, F. J., 1420
Portugal, Panasqueira, isotopes
Kelly, W. C., 1721
South Africa, Messina, copper, isotopes
Sawkins, F. J., 684
Utah, Drum Mountains, auriferous jasperoid
O'Neil, J. R., 852
Fluid inclusions, *kuroko deposits*
composition, hydrogen isotopes
Hattori, K., 535
Fluid inclusions, *salinity, temperature*
Finland, Eurajoki, cassiterite, beryl
Haapala, I., 1231
general, ore solutions, submarine
Solomon, M., 797
Mexico, Michaocan, breccia pipes, copper
Sawkins, F. J., 924
Missouri, Ozarks, lead-zinc
Leach, D. L., 931
Sweden, Laisvall, strata-bound lead-zinc
Rickard, D. T., 1255
Fluid inclusions, *techniques*
chemical analysis, laser microprobe
Tsui, T. F., 1647
sources of error, gas hydrates
Collins, P. L. F., 1435
Fluid inclusions, *temperature*
New York, Lockport Dolomite, fluorite
Haynes, S. J., 154
Kinsland, G. L., 159
Romania, Baia Mare
Lang, B., 1336
Fluorspar, *deposits*
Idaho, Bayhorse, genesis
Hoagland, A. D., 164
Illinois, Kentucky, hydrothermal system
Brecke, E. A., 1327
Kentucky, western, exploration
Trace, R. D., 1684
Folds, *geometry*
Arizona, central
DeWitt, E., 1371
Gabon, *deposits*
potash, stratigraphy, genesis
de Ruiter, P. A. C., 419
Geochemical prospecting, *dispersion patterns*
copper, molybdenum, high-rainfall environment
Chakrabarti, A. K., 1687
Geochemical prospecting, *pathfinders*
mercury, dispersion, oxide zone
Ryall, W. R., 1471
metals, correlations, laterite, Sierra Leone
Davies, T. C., 638
potash, bromine, boron
Hite, R. J., 448
Geochemical prospecting, *plant materials*
leaves, autumn coloration
Canney, F. C., 1673
shoots, gold, British Columbia
Girling, C. A., 902
Geochemical prospecting, *techniques*
X-ray fluorescence analysis, metals
Hubert, A. E., 1669

Geochemical prospecting.
(*See also* Mineral exploration)
Geochemical prospecting, *porphyry copper*
See Porphyry copper, exploration
Geochemical prospecting, *statistical methods See* Statistical methods, mineral exploration
Geochemistry, *abundance of elements*
bauxite cf. crust
Kronberg, B. I., 1869
black shale, metals
Holland, H. D., 1676
phosphorite, minor elements
Howard, P. F., 260
Geochemistry, *biological processes*
coal, sulfur content, sources
Price, F. T., 1445
gold, arsenic, accumulation, plants
Girling, C. A., 902
gold, organic materials, fixation
Utter, T., 27
metals, foliage, autumn coloration
Canney, F. C., 1673
phosphorites, model
Riggs, S. R., 285
sulfate reduction, pyrite-barite deposits
Rickard, D. T., 1060
sulfur, native, genesis
Davis, J. B., 462
Ruckmick, J. C., 469
Pawlowski, S., 475
Barker, J. M., 484
Geochemistry, *chemical fractionation*
copper, silicate melts, porphyry deposits
Mason, D. R., 1506
Fe-Co-Ni-Cu, sulfide liquid, basalt melts
Fleet, M. E., 1517
Naldrett, A. J., 1520
Mg-Fe, chromite-orthopyroxene
Oen, I. S., 1630
minor elements, silicate vs. sulfide liquids, relative volumes, importance
Campbell, I. H., 1503
Geochemistry, *mass transfer*
hydrothermal systems, evolution, cooling plutons
McDonald, J. A., 1511
Norton, D., 1513
iron, Cornwall-type, chloride solutions, circulation
Eugster, H. P., 763
porphyry copper, biotite compositions
Jacobs, D. C., 860
porphyry copper, zoning, alteration
Brimhall, G. H., Jr., 556
Geochemistry, *methods*
heating, natural assemblages
McQueen, K. G., 140
Geochemistry, *miscellaneous topics*
boiling environment, mineral deposition
Sondergeld, C. H., 109
clathration, fluid inclusions
Collins, P. L. F., 1435
Geochemistry, *techniques*
cathodoluminescence, growth zones, dolomite
Ebers, M. L., 908
Geochemistry, *biological processes.*
(*See also* Organic materials)
Geochemistry, *liquid immiscibility See* Liquid immiscibility
Geochemistry, *mass transfer.*
(*See also* Ore transport)
Geochemistry, *solubility See* Solubility
Geochronology *See* Radiometric age; Paleomagnetism
Geologic barometry
chalcocite transitions, pressure effects
Grace, J. D., 689
methods, system Zn-Fe-S
Bristol, C. C., 1496
phase equilibria, system Zn-Fe-S
Ringler, R. W., 937
Geologic thermometry, *phase equilibria*
system Zn-Fe-S cf. fluid inclusions, oxygen isotopes
Kelly, W. C., 1721
Geologic thermometry, *fluid inclusions*
See Fluid inclusions
Geophysics *See* Mineral exploration, geophysical methods
Gold, *deposits*
British Columbia, biogeochemical prospecting
Girling, C. A., 902
Finland, Kopsa, porphyry copper-gold
Gaal, G., 1198
Philippines, Baguio, geochemistry
Sawkins, F. J., 1420
Philippines, Baguio, structural control
Fernandez, H. E., 1852
Sierra Leone, placer
Morel, S. W., 1563
South Africa, grain morphology, fineness
Utter, T., 27
Utah, Drum Mountains, jasperoid
O'Neil, J. R., 852
Gold, *geochemistry*
fineness, ores cf. host rocks, Philippines
Sawkins, F. J., 1420
Gold, deposits
Philippines, Baguio, structural controls
Fernandez, H. E., 606
Greenland, *deposits*
copper, Isua, iron-formation association
Appel, P. W. U., 45
Greenstone belts
Arizona, volcanic stratigraphy
DeWitt, E., 1371
Fennoscandia, copper-zinc, uranium
Inkinen, O., 1153
Ground water, *movement See* Ore transport
Guyana, *deposits*
bauxite, complex origin
Grubb, P. L. C., 735
Guyana, *geochemistry*
bauxite, genesis
Keller, W. D., 116
Hot springs *See* Thermal waters
Hydrogeology *See* Ore-forming fluids, hydrology; Ore transport; Thermal waters
Hydrothermal alteration, *general*
detection, remote-sensing, spectra
Hunt, G. R., 1613
Hydrothermal alteration, *potassic*
breccia pipe, copper
Knutson, J., 814
iron deposits, Cornwall-type
Eugster, H. P., 763
porphyry copper-gold, molybdenum
Gaal, G., 1198
Hydrothermal alteration, *sequence*
Bolivia, tin belt, age cf. intrusion
Grant, J. N., 838
New Mexico, Santa Rita, biotite geochemistry
Jacobs, D. C., 860
Romania, Baia Mare, polymetallic
Lang, B., 1336
Hydrothermal alteration, *sodic*
metasediments, breccia, copper, cobalt
Laznicka, P., 1352
Hydrothermal alteration, *zoning*
massive sulfide, Finland, Aijala-Orijarvi
Latvalahti, U., 1035
molybdenum, breccia pipe, Texas
Sharp, J. E., 517
molybdenum, porphyry, Norway
Geyti, A., 1211
strata-bound copper-zinc, Finland
Huhtala, T., 1069
Hydrothermal alteration, *zoning, porphyry copper*
British Columbia, Caribou-Bell
Bailey, D. G., 125
Montana, Butte, mass-transfer mechanisms
Brimhall, G. H., Jr., 556
New South Wales, Yeoval, dacite dike
Ambler, E. P., 67
Hydrothermal alteration, *zoning.*
(*See also* Hydrothermal alteration; zoning, porphyry copper; Mineral zoning)
Idaho, *deposits*
fluorspar, Bayhorse, deposition
Hoagland, A. D., 164
molybdenum, porphyry, K-Ar age
Schmidt, E. A., 698
Armstrong, R. L., 699
Igneous processes, *differentiation*
deuteric fluids, genesis
Cloke, P. L., 1823
fractionation, iron-oxide melt
Lundberg, B., 1131
Igneous processes, *differentiation.*
(*See also* Magmas, differentiation; Liquid immiscibility)
Igneous rocks, *alkalic*
apatite content, Europe, U.S.S.R.
Notholt, A. J. G., 339
carbonatite, apatite content
Erdosh, G., 331
carbonatite, Colorado, Wet Mountains, primary cf. replacement
Armbrustmacher, T. J., 888
carbonatite, Finland, Sokli complex
Vartiainen, H., 1296
nepheline syenite, Norway, Stjernoy
Geis, H. P., 1286
Igneous rocks, *ultramafic*
ophiolite complex, copper, United Arab Emirates
Hassan, M. A., 919

Igneous rocks, *volcanics*
lead-isotope geochemistry, Colorado
Doe, B. R., 1
Igneous rocks, *differentiation See* Igneous processes, differentiation; Magmas, differentiation
Igneous rocks, *generation See* Magmas, generation
Igneous rocks, *mafic See* Intrusions, layered
Illinois, *geochemistry*
Illinois Basin, coal, sulfur isotopes
Price, F. T., 1445
I.M.A. Commission on Ore Microscopy
reports, 1542
Indiana, *geochemistry*
Illinois Basin, coal, sulfur isotopes
Price, F. T., 1445
Industrial minerals
nepheline syenite, Norway, Stjernoy
Geis, H. P., 1286
Infrared surveys *See* Mineral exploration, geophysical methods
Interesting papers in other journals
titles, 176, 504, 721, 963, 1318, 1538, 1706, 1904
Intrusions, *layered, petrology*
Finland, Vammala, ultramafic, nickel
Hakli, T. A., 1166
Ontario, Sudbury, differentiation, rare-earth evidence
Kuo, H. Y., 590
Intrusions, *layered, structure*
Sierra Leone, Freetown complex
Morel, S. W., 1563
Intrusions, *structure*
carbonatite complex, Finland, Sokli
Vartiainen, H., 1296
Intrusions, *layered, petrology.*
(*See also* Igneous rocks, ultramafic)
Iran, *deposits*
iron, Mishdovan, magnetite ore
Foerster, H., 1485
Iraq, *deposits*
sulfur, Mishraq mine, structure, stratigraphy
Barker, J. M., 484
Iron, *deposits*
Finland, Sokli carbonatite complex
Vartiainen, H., 1296
Pennsylvania, Cornwall-type, geochemical model
Eugster, H. P., 763
Sardinia, magnetite skarn, petrology
Verkaeren, J., 53
Sweden, Kiruna district, apatite ores
Lundberg, B., 1131
Iron, *deposits.*
(*See also* Iron-formation; Stratabound deposits, iron)
Iron, *geochemistry.*
(*See also* Iron-formation, geochemistry; Phase equilibria)
Iron-formation, *deposits*
Arizona, stratigraphic tool
DeWitt, E., 1371
Mauritania, sedimentation, metamorphism, age
Bronner, G., 77
Sierra Leone, exploration
Morel, S. W., 1563
Iron-formation, *geochemistry*
mineral assemblages, metamorphism
Frost, B. R., 775
strata-bound sulfides, association
Stanton, R. L., 1890
Laing, W. P., 1892
Isotopes, *hydrogen, oxygen*
Philippines, Baguio, fluids, origin
Sawkins, F. J., 1420
Isotopes, *hydrogen, oxygen, carbon*
Colorado, Creede
Bethke, P. M., 1832
Isotopes, *hydrogen, oxygen, sulfur*
Japan, kuroko deposits, Neogene veins
Hattori, K., 535
Isotopes, *hydrogen, oxygen, sulfur, carbon*
Portugal, Panasqueira
Kelly, W. C., 1721
South Africa, Messina
Sawkins, F. J., 684
Utah, Drum Mountains, auriferous jasperoid
O'Neil, J. R., 852
Isotopes, *lead*
Andes, igneous rocks, metallogeny
McNutt, R. H., 827
Colorado, San Juans, polymetallic ores
Doe, B. R., 1
Finland, Pyhasalmi, massive sulfide
Helovuori, O., 1084
Greenland, Isua, strata-bound copper
Appel, P. W. U., 45
Mexico, northern, ore deposits
Cumming, G. L., 1395
Missouri, southeast, lead-zinc
Sverjensky, D. A., 149
New Mexico, southern, reinterpretation
Ewing, T. E., 678
Wyoming, common lead corrections
Ludwig, K. R., 1654
Isotopes, *oxygen, carbon*
Colorado, Wet Mountains, carbonatite
Armbrustmacher, T. J., 888
Isotopes, *oxygen, sulfur, carbon*
Northern Territory, Redbank
Knutson, J., 814
Sweden, Laisvall, strata-bound lead-zinc
Rickard, D. T., 1255
Isotopes, *strontium, initial ratios*
Chile, Disputada mine
Halpern, M., 129
Isotopes, *sulfur, general*
massive sulfides, submarine effusion
Solomon, M., 797
sulfur deposits, biological processes
Davis, J. B., 462
Isotopes, *sulfur, localities*
Finland, Pahtavuoma, strata-bound copper-zinc
Inkinen, O., 1153
Finland, Pyhasalmi, copper-zinc
Helovuori, O., 1084
Finland, Vammala
Hakli, T. A., 1166
Finland, Vihanti
Rehtijarvi, P., 1102
Greenland, Isua, strata-bound copper
Appel, P. W. U., 45
Illinois, Indiana, coal
Price, F. T., 1445
Missouri, southeast, lead-zinc
Sverjensky, D. A., 149
Sweden, Asen, strata-bound pyrite-barite
Rickard, D. T., 1060
Isotopes, *uranium, thorium*
radioactive equilibria
Ludwig, K. R., 1654
Isotopes, *carbon See* various combinations below
Japan, *geochemistry*
kuroko deposits, Neogene veins
Hattori, K., 535
Kansas, *geochemistry*
Kansas City region, zinc, black shales
Coveney, R. M., Jr., 131
Kentucky, *deposits*
fluorspar, western, exploration
Trace, R. D., 1684
Kuroko deposits
general, cf. massive sulfides, Norwegian Caledonides
Pouit, G., 1895
Geis, H. P., 1896
general, ore-fluid hydrology, review
Henley, R. W., 1600
Kuroko deposits, *geochemistry*
Japan, fluid inclusions, isotopes
Hattori, K., 535
ore-forming fluids, effusion models
Solomon, M., 797
Lake Superior region, *deposits*
iron-formation, metamorphism
Frost, B. R., 775
Lake Superior region, *geochemistry*
general, radiometric ages, Archean
Peterman, Z. E., 1544
Laos, *deposits*
potash, geochemistry
Hite, R. J., 448
Laterite
composition, heavy metals, Sierra Leone
Davies, T. C., 638
Lead, *deposits*
Mexico, northern, lead isotopes
Cumming, G. L., 1395
Lead, *geochemistry*
solubility, bisulfide solutions
Giordano, T. H., 1637
Lead, *deposits.*
(*See also* Base metals; Polymetallic ores; Strata-bound deposits)
Lead, *geochemistry See* Isotopes, lead
Lead-zinc, *deposits*
Mississippi Valley, hydrothermal system
Brecke, E. A., 1327
Missouri, Ozarks, fluid inclusions
Leach, D. L., 931
Lead-zinc, *deposits.*
(*See also* Base metals; Polymetallic ores; Strata-bound deposits)
Lead-zinc-silver, *deposits See* Base metals-silver; Polymetallic ores; Strata-bound deposits
Liquid immiscibility
chromium-rich oxyarsenide liquid
Oen, I. S., 1630
magnetite-apatite ores
Lundberg, B., 1131
metals, partitioning, experimental
Fleet, M. E., 1517
Naldrett, A. J., 1520
sulfide, silicate melts, element partitioning
Campbell, I. H., 1503

Magmas, *differentiation*
Ontario, Sudbury, rare earths, fractionation
Kuo, H. Y., 590
Magmas, *experimental studies*
partitioning, Fe-Co-Ni-Cu, sulfide liquid, basalt melt
Fleet, M. E., 1517
Naldrett, A. J., 1520
Magmas, *generation*
calc-alkaline, Andes, source, lead isotopes
McNutt, R. H., 827
iron-rich, Iran cf. Chile
Foerster, H., 1485
iron-rich, Sweden cf. Chile
Lundberg, B., 1131
Magmas, *geochemistry*
fluids, hydrothermal systems
McDonald, J. A., 1511
Norton, D., 1513
Magmas, *differentiation.*
(*See also* Igneous processes, differentiation)
Magmas, *experimental studies.*
(*See also* Liquid immiscibility)
Major-element analyses, *alteration suites*
dacite dike, porphyry copper, New South Wales
Ambler, E. P., 67
metavolcanics, intrusives, Finland, Aijala-Orijarvi
Latvalahti, U., 1035
Major-element analyses, *igneous rocks*
intrusives, Finland, porphyry copper
Gaal, G., 1198
Major-element analyses, *minerals*
chromite, Spain, Malaga
Oen, I. S., 1630
skarn, magnetite deposit, Sardinia
Verkaeren, J., 53
Major-element analyses, *ores*
apatite, U.S.S.R.
Notholt, A. J. G., 339
copper, Yukon Territory, Minto
Pearson, W. N., 1577
copper-zinc, uranium, Sweden
Inkinen, O., 1153
phosphate, Africa, southern
Fuller, A. O., 221
phosphate, Peru, Sechura Desert
Cheney, T. M., 232
phosphorite, Australia, northern
Howard, P. F., 260
uraniferous phosphorite, Finland
Rehtijarvi, P., 1102
Major-element analyses, *rocks*
amphibolites, Greenland, Isua
Appel, P. W. U., 45
breccia pipes, fragments, matrix
Knutson, J., 814
felsic volcanics, Finland, Pyhasalmi
Helovuori, O., 1084
felsic volcanics, Sweden, Duobblon
Lindroos, H., 1118
felsic volcanics, Sweden, Kiruna district
Lundberg, B., 1131
intrusives, Quebec, Don Rouyn
Goldie, R., 1680
metamorphic, Sweden, Yxsjoberg, tungsten
Ohlsson, L. G., 1012
metasediments, albitized, Yukon Territory
Laznicka, P., 1352
metavolcanics, Finland, Pyhasalmi-Pielavesi
Huhtala, T., 1069
nepheline syenite, carbonatite, Norway, Stjernoy
Geis, H. P., 1286
ultramafic, Finland, Vammala
Hakli, T. A., 1166
Manganese, *geochemistry*
oxides cf. iron, genetic significance
Bostroem, K., 1002
Manganese, *deposits See* Strata-bound deposits, manganese
Manitoba, *geochemistry*
Ruttan mine, sphalerite geobarometry
Bristol, C. C., 1496
Mantle
composition, metals, source, vs. crust
McNutt, R. H., 827
Mantle.
(*See also* Crust)
Marine geology, *mineral resources See* Ocean floors
Massive sulfide deposits, *genesis*
general, submarine effusion, models
Solomon, M., 797
Massive sulfide deposits, *metamorphism*
Virginia, Gossan Lead
Henry, D. K., 645
Massive sulfide deposits, *volcanogenic*
base metals, Finland, Aijala-Orijarvi
Latvalahti, U., 1035
base metals, New Brunswick, Bathurst
Harley, D. N., 786
base metals, New South Wales, mercury distribution
Ryall, W. R., 1471
copper, Arizona, stratigraphic guides
DeWitt, E., 1371
copper-zinc, Finland, Pyhasalmi
Helovuori, O., 1084
copper-zinc, Finland, Pyhasalmi-Pielavesi
Huhtala, T., 1069
general, geothermal aspects, review
Henley, R. W., 1600
general, sea-floor depressions, association
Pouit, G., 1895
Geis, H. P., 1896
Massive sulfide deposits, *deformation See* Massive sulfide deposits, metamorphism
Massive sulfide deposits, *genesis.*
(*See also* Massive sulfide deposits, volcanogenic)
Massive sulfide deposits, *metamorphism.*
(*See also* Metamorphic rocks, metallic ores)
Mauritania, *deposits*
iron-formations, Tiris region
Bronner, G., 77
Mercury, *geochemistry*
abundance, Hg/Zn, Hg/Cu, Sweden, Skellefte
Widenfalk, L., 1307
distribution, massive-sulfide deposit
Ryall, W. R., 1471
Metallogenic provinces
Fennoscandia, review
Frietsch, R., 975
Mexico, northern, lead isotopes
Cumming, G. L., 1395
Metals, *deposits*
Sierra Leone, discoveries, review
Morel, S. W., 1563
Metals, *deposits.*
(*See also* Base metals; Polymetallic ores)
Metamorphic rocks, *metallic ores*
geochemistry, Finland, Aijala-Orijarvi
Latvalahti, U., 1035
textures, geochemistry, Greenland
Appel, P. W. U., 45
Metamorphic rocks, *mineral assemblages*
copper deposit, gneiss
Pearson, W. N., 1577
Metamorphic rocks, *metallic ores.*
(*See also* Massive sulfide deposits, metamorphism)
Metamorphism, *contact*
zoning, oolitic iron ore, Spain
Lunar, R., 751
Metamorphism, *mass transfer*
iron, magnetite skarn, Sardinia
Verkaeren, J., 53
Metamorphism, *regional*
iron-formation, paragenesis, system Fe-Si-C-O-H
Frost, B. R., 775
massive sulfide, Gossan Lead, mineralogy
Henry, D. K., 645
P-T conditions, Norway, Vest-Agder
Konnerup-Madsen, J., 1221
sulfide ores, mineral assemblages, Finland
Huhtala, T., 1069
Metamorphism, *contact.*
(*See also* Skarn)
Metamorphism, *dynamic See* Deformation
Mexico, *deposits*
borates, zeolites, Magdalena
Lefond, S. J., 1883
copper, Michaocan, breccia pipes, fluid inclusions
Sawkins, F. J., 924
Mexico, *geochemistry*
Naica, fluid inclusions
Erwood, R. J., 95
northern, ore deposits, lead isotopes
Cumming, G. L., 1395
Microscopic methods
scanning electron microscopy, bauxitization
Keller, W. D., 116
scanning electron microscopy, gold grains
Utter, T., 27
Mineral data, *carbonates*
dolomite, growth zones, cathodoluminescence
Ebers, M. L., 908
Mineral data, *oxides, chromite*
composition, nickel deposit, Finland
Hakli, T. A., 1166
composition, Spain, peridotite
Oen, I. S., 1630

Mineral data, *oxides, iron-rich*
spectral characteristics, altered rocks
Hunt, G. R., 1613
Mineral data, *oxides, magnetite*
trace elements, Sweden, Kiruna district
Lundberg, B., 1131
Mineral data, *phosphates, apatite*
composition, crystal structure, Peru
Cheney, T. M., 232
composition, rare earths, Finland
Himmi, R., 1183
composition, zoned crystal
Kelly, W. C., 1721
Mineral data, *silicates, biotite*
composition, Yukon Territory, Minto
Pearson, W. N., 1577
geochemistry, porphyry copper
Jacobs, D. C., 860
Mineral data, *silicates, general*
mafic, composition, Finland
Hakli, T. A., 1166
spectral characteristics, altered rocks
Hunt, G. R., 1613
Mineral data, *silicates, iron-rich*
stabilities, metamorphism
Frost, B. R., 775
Mineral data, *silicates, miscellaneous*
howlite, borosilicate, X-ray data
Lefond, S. J., 1883
tourmaline, Finland, composition
Himmi, R., 1183
zeolites, borate association
Lefond, S. J., 1883
Mineral data, *silicates, pyroxene*
composition, Spain, pyroxenite
Oen, I. S., 1630
Mineral data, *sulfates*
alunite, jarosite, spectral characteristics, altered rocks
Hunt, G. R., 1613
Mineral data, *sulfides, copper*
chalcocite transitions, pressure effects
Grace, J. D., 689
Mineral data, *sulfides, galena*
minor-element abundance
Lang, B., 1336
Mineral data, *sulfides, general*
compositions, associations, massive sulfide
Henry, D. K., 645
Mineral data, *sulfides, miscellaneous*
carrollite-linnaeite, compositions, stabilities
Craig, J. R., 657
Mineral data, *sulfides, nickel-rich*
compositions, Finland
Hakli, T. A., 1166
Mineral data, *sulfides, sphalerite*
composition, Portugal, Panasqueira
Keily, W. C., 1721
minor-element abundance
Lang, B., 1336
Mineral economics
world, potash, political influences
Rittenhouse, P. A., 353
Mineral exploration, *geochemical methods*
chemical haloes, strata-bound base metals
Solomon, M., 797
Hg/Zn, Hg/Cu ratios, boulder prospecting
Widenfalk, L., 1307
lead-isotope zonation
Ewing, T. E., 678
Mineral exploration, *geophysical methods*
borehole gravity surveys, sulfur
Schmoker, J. W., 1462
cathodoluminescence, growth zones, detection
Ebers, M. L., 908
gravity, magnetics, Missouri, southeast
Cordell, L., 1383
photogeology, Landsat, circular features, porphyry copper
Eggers, A. J., 1490
remote-sensing, altered rocks, spectra
Hunt, G. R., 1613
remote sensing, foliage, autumn coloration
Canney, F. C., 1673
Mineral exploration, *ore guides*
copper, altered clasts, volcanic breccia
Bailey, D. G., 125
fluorspar, stratigraphy, paleophysiography
Hoagland, A. D., 164
geothermal systems, volcanic terranes
Henley, R. W., 1600
lead-zinc, Sweden, Vassbo
Christofferson, H. C., 1239
Mineral exploration, *programs*
Finland, Norway, Sweden
Frietsch, R., 975
Finland, Sokli carbonatite complex
Vartiainen, H., 1296
Sierra Leone, geologic mapping
Morel, S. W., 1563
success, ingredients
Muessig, S , 732
Sweden, uranium, stratabound
Lindroos, H., 1118
Mineral exploration, *structural guides*
fault systems, Kentucky, fluorspar
Trace, R. D., 1684
lineaments, ore association
Marshall, B., 942
vein systems, structural analysis
Fernandez, H. E., 606
Mineral exploration, *geochemical methods.*
(*See also* Geochemical prospecting; Porphyry copper, exploration)
Mineral exploration, *structural guides.*
(*See also* Structural controls)
Mineral resources
Europe, U.S.S.R., igneous phosphate, production
Notholt, A. J. G., 339
Fennoscandia, exploration, discoveries, production, review
Frietsch, R., 975
North Dakota, Montana, potash
Anderson, S. B., 358
uranium, Canada, South Africa
Mehliss, A. T. M., 1702
Robertson, D. S., 1702
world, phosphates, development
Howard, P. F., 192
world, potash, political influences
Rittenhouse, P. A., 353
world, potash, review
Dunlap, J. C., 351
world, sulfur, review
Bodenlos, A. J., 459
Mineral zoning, *contact aureoles*
Finland, Sokli carbonatite complex
Vartiainen, H., 1296
Mineral zoning, *miscellaneous*
copper, sulfides, Yukon Territory, Minto
Pearson, W. N., 1577
lead-zinc, Sweden, Laisvall
Rickard, D. T., 1255
New Zealand, thermal waters, metals
Grant, M. A., 702
tungsten skarns, Sweden, central
Ohlsson, L. G., 1012
Mineral zoning, *porphyry-type deposits*
Quebec, Don Rouyn, Archean
Goldie, R., 1680
Texas, molybdenum, breccia pipe
Sharp, J. E., 517
Yukon Territory, Dolores Creek, soda metasomatism
Laznicka, P., 1352
Mineral zoning, *regional*
barite, base-metals, Mississippi Valley
Brecke, E. A., 1327
elements, oolitic iron ore, Spain
Lunar, R., 751
Mineral zoning, *strata-bound deposits*
lead-zinc-silver, New South Wales, Broken Hill
Stanton, R. L., 1890
Laing, W. P., 1892
lead-zinc-silver, Queensland, cyclic deposition
Finlow-Bates, T., 1408
Mineral zoning, *vein deposits*
Romania, Baia Mare, vertical
Lang, B., 1336
Mineral zoning, *contact aureoles.*
(*See also* Hydrothermal alteration, zoning; Metamorphism, contact; Skarn)
Mineral zoning, *porphyry-type deposits.*
(*See also* Hydrothermal alteration, zoning, porphyry copper)
Mineral zoning, *regional.*
(*See also* Metallogenic provinces)
Mississippi Valley, *deposits*
fluorspar, lead-zinc, barite, paleohydrology
Brecke, E. A., 1327
lead-zinc, basement structure
Cordell, L., 1383
lead-zinc, source rocks
Coveney, R. M., Jr., 131
Mississippi Valley, *geochemistry*
lead-zinc deposits, sulfur, lead deposits
Sverjensky, D. A., 149
Missouri, *deposits*
lead-zinc, Ozarks, fluid inclusions
Leach, D. L., 931
Missouri, *geochemistry*
Kansas City region, zinc, black shales
Coveney, R. M., Jr., 131
southeast, sulfur, lead isotopes
Sverjensky, D. A., 149
Missouri, *geophysics*
southeast, gravity, aeromagnetics
Cordell, L., 1383
Molybdenum, *deposits*
New Zealand, Northwest Nelson, K-Ar ages
Eggers, A. J., 628
Norway, Flottorp, strata-bound, fluid inclusions
Konnerup-Madsen, J., 1221
Texas, breccia pipe, zoning
Sharp, J. E., 517

Molybdenum, *deposits.*
(*See also* Porphyry molybdenum)
Montana, *deposits*
molybdenum, porphyry, K-Ar age
Schmidt, E. A., 698
Armstrong, R. L., 699
potash, Williston Basin, stratigraphy
Anderson, S. B., 358
Montana, *geochemistry*
Butte, hydrothermal alteration, mass-transfer mechanisms
Brimhall, G. H., Jr., 556
general, radiometric ages, Archean
Peterman, Z. E., 1544
New Brunswick, *deposits*
base-metals, Bathurst, submarine effusion
Solomon, M., 797
massive sulfide, Bathurst, caldera complex
Harley, D. N., 786
metals, paleoclimatic controls
McLeod, M. J., 1529
van de Poll, H. W., 1530
potash, Salt Springs reservation
Anderle, J. P., 389
New Mexico, *geochemistry*
Santa Rita, biotite compositions
Jacobs, D. C., 860
southern, base-metal deposits, lead isotopes
Ewing, T. E., 678
New South Wales, *deposits*
base metals, Woodlawn, mercury distribution
Ryall, W. R., 1471
lead-zinc-silver, Broken Hill, structure
Stanton, R. L., 1890
Laing, W. P., 1892
New South Wales, *geochemistry*
Yeoval, porphyry copper, vesicles
Ambler, E. P., 67
New York, *geochemistry*
Lockport Dolomite, fluid inclusions
Haynes, S. J., 154
Kinsland, G. L., 159
New Zealand, *deposits*
copper, porphyry, general, Landsat imagery
Eggers, A. J., 1490
molybdenum, Northwest Nelson, K-Ar ages
Eggers, A. J., 628
New Zealand, *geochemistry*
Broadlands geothermal field, metal zoning
Grant, M. A., 702
Nickel, *deposits*
Ontario, Sudbury, rare-earth contents
Kuo, H. Y., 590
Sri Lanka, eastern, plate boundary
Munasinghe, T., 1495
Nickel, *geochemistry*
diffusion, recrystallization, heating experiments
McQueen, K. G., 140
partitioning, sulfide liquid, basalt melts
Fleet, M. E., 1517
Naldrett, A. J., 1520
Nickel, *deposits.*
(*See also* Copper-nickel, deposits)
Niobium, *deposits*
Finland, Sokli carbonatite complex
Vartiainen, H., 1296
North Dakota, *deposits*
potash, Williston Basin, stratigraphy
Anderson, S. B., 358
North Sea, *deposits*
potash, British sector, stratigraphy
Smith, D. B., 397
Northern Territory, *deposits*
copper, Redbank, breccia pipes
Knutson, J., 814
Northern Territory, *geochemistry*
Georgina Basin, phosphorite, genesis
Howard, P. F., 260
McArthur River, lead-zinc-silver deposit
Scott, K. M., 1693
Williams, N., 1695
Finlow-Bates, T., 1697
Williams, N., 1699
Norway, *deposits*
base metals, volcanogenic
Pouit, G., 1895
Geis, H. P., 1896
general, review
Frietsch, R., 975
industrial minerals, nepheline syenite, Stjernoy
Geis, H. P., 1286
molybdenum, Flottorp, fluid inclusions
Konnerup-Madsen, J., 1221
molybdenum, porphyry, Oslo rift
Geyti, A., 1211
Nova Scotia, *deposits*
metals, paleoclimatic controls
McLeod, M. J., 1529
van de Poll, H. W., 1530
Ocean floors, *mineral resources*
phosphate, Africa, southern, offshore
Fuller, A. O., 221
potash, North Sea
Smith, D. B., 397
sulfur, Gulf of Mexico, biogenesis
Davis, J. B., 462
Ontario, *deposits*
copper, Timmins, genesis
Griffis, A. T., 695
Davies, J. F., 697
phosphates, carbonatite complexes, complexes
Erdosh, G., 331
Ontario, *geochemistry*
Sudbury, rare earths
Kuo, H. Y., 590
Ophiolite *See* Igneous rocks, ultramafic
Ore-forming fluids, *geochemistry*
halite trend, fluid inclusions
Cloke, P. L., 1823
iron, solubility, chloride solutions
Eugster, H. P., 763
lead, transport, sulfide complexing, evaluation
Giordano, T. H., 1637
lead-zinc, sandstone, Norway, Laisvall
Rickard, D. T., 1255
metals, submarine effusion, models
Solomon, M., 797
mineral deposition, boiling, role
Sondergeld, C. H., 109
porphyry copper, evolution, Montana, Butte
Brimhall, G. H., Jr., 556
thermal waters, gold, silver depositing
Grant, M. A., 702
veins, Finland, tin greisen
Haapala, I., 1231
veins, Philippines, gold
Sawkins, F. J., 1420
veins, Portugal, tin-tungsten
Kelly, W. C., 1721
Ore-forming fluids, *hydrology*
Colorado, Creede, multiple sources
Bethke, P. M., 1832
Colorado, Schwartzwalder mine, uranium
Bird, A. G., 947
general, circulation, native-sulfur deposits
Ruckmick, J. C., 469
general, hydrothermal system, models
McDonald, J. A., 1511
Norton, D., 1513
general, submarine systems, review
Henley, R. W., 1600
Iraq, sulfur deposits, genesis
Barker, J. M., 484
New York, fluorite, geothermal gradient
Haynes, S. J., 154
Kinsland, G. L., 159
ocean floor, behavior, effusion
Jones, H., 1894
Turner, J. S., 1895
Queensland, Mount Isa, pulsed supply
Finlow-Bates, T., 1408
Ore-forming fluids, *isotope geochemistry*
hydrogen, oxygen, carbon, Colorado, Creede
Bethke, P. M., 1832
lead, sulfur, Mississippi Valley, galena
Sverjensky, D. A., 149
Ore-forming fluids, *porphyry copper, general*
biotite composition, thermodynamic calculations
Jacobs, D. C., 860
Ore-forming fluids, *source*
Japan, kuroko, vein deposits, isotopic evidence
Hattori, K., 535
Mexico, Naica, base metals-silver
Erwood, R. J., 95
Mexico, northern, lead-isotope evidence
Cumming, G. L., 1395
Mississippi Valley, fluorspar, lead-zinc
Brecke, E. A., 1327
Mississippi Valley, lead-zinc
Leach, D. L., 931
Northern Territory, copper, alkaline magma
Knutson, J., 814
Sweden, central, tungsten, skarn, veins
Ohlsson, L. G., 1012
Utah, Drum Mountains, gold
O'Neil, J. R., 852
Ore-forming fluids, *geochemistry.*
(*See also* Fluid inclusions)
Ore-forming fluids, *hydrology.*
(*See also* Ore transport)
Ore-forming fluids, *isotope geochemistry*
lead, Colorado, San Juans
Doe, B. R., 1

Ore transport, *general*
geothermal cells, size
Sawkins, F. J., 1420
ocean floor, flow from vents, patterns
Jones, H., 1894
Turner, J. S., 1895
sourcelines, pathlines, simulation
McDonald, J. A., 1511
Norton, D., 1513
Ore transport, *localites*
lead-zinc, Sweden, paleohydrology
Rickard, D. T., 1255
Ore transport, *localities*
gold, Philippines, Baguio
Fernandez, H. E., 1852
iron, Pennsylvania, Cornwall, convection model
Eugster, H. P., 763
Ore transport, *general.*
(*See also* Ore-forming fluids, hydrology)
Organic materials
distribution, stream cf. auriferous conglomerate
Button, A., 1876
Organic materials, *geochemistry*
gold, arsenic, plants, British Columbia
Girling, C. A., 902
lead-zinc, Sweden, Laisvall
Rickard, D. T., 1255
Organic materials.
(*See also* Coal)
Pacific region, *deposits*
copper, porphyry, southwestern, geochemistry
Mason, D. R., 1506
Paleoclimatology
mineral facies, control, Canada, eastern
McLeod, M. J., 1529
van de Poll, H. W., 1530
Paleogeographic controls
gold, South Africa, provenance
Utter, T., 27
lead-zinc, Sweden, Laisvall
Rickard, D. T., 1255
lead-zinc, Sweden, Vassbo
Christofferson, H. C., 1239
phosphate, Florida, sedimentation, model
Riggs, S. R., 285
phosphate, Florida, types, petrology
Riggs, S. R., 195
phosphate, plate-tectonic models
Cook, P. J., 315
potash, Africa, Congo Basin
de Ruiter, P. A. C., 419
potash, Brazil
Szatmari, P., 432
potash, Thailand, Laos
Hite, R. J., 448
Paleomagnetism, *applications*
phosphorites, paleolatitude control
Cook, P. J., 315
tin-tungsten, Portugal, Panasqueira, thermal history
Kelly, W. C., 1721
Panama, *deposits*
copper, porphyry, Cerro Colorado, K-Ar age
Spatz, D. M., 693
Clark, A. H., 695
Paragenesis, *miscellaneous deposits*
copper-tungsten, Finland, Ylojarvi
Himmi, R., 1183
iron-formation, metamorphism
Frost, B. R., 775
zinc, dolomite microstratigraphy, Tennessee
Ebers, M. L., 908
Paragenesis, *veins*
polymetallic, Colorado, Creede
Bethke, P. M., 1832
polymetallic, Romania, Baia Mare
Lang, B., 1336
tin-tungsten, Portugal, Panasqueira
Kelly, W. C., 1721
Partition coefficients *See* Geochemistry, chemical fractionation
Pennsylvania, *deposits*
iron, Cornwall-type, geochemical model
Eugster, H. P., 763
Peru, *deposits*
copper-zinc, molybdenum, Antamina, K/Ar age
McKee, E. H., 928
phosphates, Sechura Desert, stratigraphy, genesis
Cheney, T. M., 232
Peru, *geochemistry*
Finlandia, Casapalca, fluid inclusions
Tsui, T. F., 1647
Phase equilibria, *experimental studies*
Cu-Co-S, carrollite-linnaeite
Craig, J. R., 657
Cu-S, chalcocite transitions, pressure effects
Grace, J. D., 689
Fe-Ni-S
McQueen, K. G., 140
Phase equilibria, *natural assemblages*
Ca-Fe-Al-Si-C-O, magnetite skarn
Verkaeren, J., 53
Cu-Co-Fe-S, carrollite-linnaeite
Craig, J. R., 657
Na-K-Cl-H_2O, fluid inclusions
Erwood, R. J., 95
Phase equilibria, *theoretical studies*
Fe-Si-C-O-H, iron-formation, metamorphism
Frost, B. R., 775
NaCl-KCl-H_2O, fluid inclusions
Cloke, P. L., 1823
trace-element partitioning, equilibration
Campbell, I. H., 1503
Philippines, *deposits*
gold, Baguio, structural controls
Fernandez, H. E., 606
gold, copper, Baguio, structure
Fernandez, H. E., 1852
Philippines, *geochemistry*
Baguio, fluid inclusions, isotopes
Sawkins, F. J., 1420
Phosphate, *deposits*
Finland, Vihanti, uranium, Precambrian
Rehtijarvi, P., 1102
Phosphates, *deposits*
Africa, southern, coastal, review
Fuller, A. O., 221
Australia, Georgina Basin, geochemistry, genesis
Howard, P. F., 260
Europe, U.S.S.R., igneous, review
Notholt, A. J. G., 339
Finland, Sokli carbonatite complex
Vartiainen, H., 1296
Florida, sedimentation, model
Riggs, S. R., 285
Florida, types, petrology, genesis
Riggs, S. R., 195
general, plate-tectonic models
Cook, P. J., 315
general, special issue, preface
Skinner, B. J., 191
Ontario, Quebec, carbonatite complexes
Erdosh, G., 331
Peru, Sechura Desert, stratigraphy, genesis
Cheney, T. M., 232
world, production, discoveries
Howard, P. F., 192
Phosphorus, *geochemistry*
sources, migration, fixation, phosphorite
Riggs, S. R., 285
Photogeology *See* Mineral exploration, geophysical methods
Placers
gold, ancient, organic materials, association
Button, A., 1876
gold, grain morphology, fineness, South Africa
Utter, T., 27
Plate tectonics, *intercontinental correlations*
Sierra Leone cf. Guyana Shield
Morel, S. W., 1563
Plate tectonics, *metallogenesis, areas*
Africa, Congo Basin, potash
de Ruiter, P. A. C., 419
Sri Lanka, plate boundary, nickel, iron
Munasinghe, T., 1495
Plate tectonics, *metallogenesis, general*
phosphates, spatial, temporal relations
Cook, P. J., 315
Platinum, *deposits*
Sierra Leone, Freetown Complex, pathfinders
Davies, T. C., 638
Poland, *deposits*
sulfur, genesis, exploration
Pawlowski, S., 475
Polymetallic ores, *deposits*
Colorado, Creede, geochemistry
Bethke, P. M., 1832
Colorado, San Juans, genesis, lead isotopes
Doe, B. R., 1
Japan, fluid inclusions, isotopes
Hattori, K., 535
Romania, Baia Mare, structure, geochemistry
Lang, B., 1336
Porphyry copper, *deposits*
Andes, igneous source rocks, lead isotopes
McNutt, R. H., 827
Butte, mass transfer, mechanisms, hypogene leaching
Brimhall, G. H., Jr., 556
Colombia, Choco
Chakrabarti, A. K., 1687
New South Wales, vesicle compositions
Ambler, E. P., 67

Panama, Cerro Colorado, K-Ar age
Spatz, D. M., 693
Clark, A. H., 695
Quebec, Don Rouyn, Archean
Goldie, R., 1680
Porphyry copper, *exploration*
altered clasts, volcanic breccia
Bailey, D. G., 125
alumina/alkali ratio
Mason, D. R., 1506
photogeology, Landsat, circular features
Eggers, A. J., 1490
Porphyry copper, *hydrothermal alteration*
biotite compositions cf. alteration type
Jacobs, D. C., 860
Porphyry copper, *hydrothermal alteration.* (*See also* Hydrothermal alteration, zoning, porphyry copper)
Porphyry copper-molybdenum, *deposits*
Finland, Pohjanmaa, Precambrian
Gaal, G., 1198
Porphyry molybdenum, *deposits*
Idaho, Montana, K-Ar age
Armstrong, R. L., 699
Idaho, Montana, K-Ar ages
Schmidt, E. A., 698
Norway, Oslo rift, hydrothermal alteration
Geyti, A., 1211
Portugal, *geochemistry*
Panasqueira, fluid inclusions, isotopes
Kelly, W. C., 1721
Potash, *deposits*
Africa, Congo and Gabon Basins, stratigraphy
de Ruiter, P. A. C., 419
Brazil, Amazon, Sergipe
Szatmari, P., 432
England, North Sea, stratigraphy
Smith, D. B., 397
England, stratigraphy, deformation
Woods, P. J. E., 409
evaporites, discoveries
Dunlap, J. C., 351
general, special issue, preface
Skinner, B. J., 191
New Brunswick, stratigraphy, deformation
Anderle, J. P., 389
Saskatchewan, stratigraphy
Worsley, N., 377
Thailand, Laos, geochemistry
Hite, R. J., 448
Williston Basin, North Dakota, Montana, stratigraphy
Anderson, S. B., 358
world, production, political influences
Rittenhouse, P. A., 353
Precambrian, *miscellaneous*
time scale, Archean, United States
Peterman, Z. E., 1544
Precambrian, *sedimentation*
barite, South Africa, Rhodesia, Australia
Thorpe, R. I., 700
Pyrite, *deposits See* Massive sulfide; Stratabound deposits
Pyrometasomatic deposits *See* Skarn; Metamorphism, contact
Quebec, *deposits*
copper, porphyry, Don Rouyn, Archean
Goldie, R., 1680
phosphates, carbonatite complexes
Erdosh, G., 331
Queensland, *deposits*
lead-zinc-silver, Mount Isa, cyclic deposition
Finlow-Bates, T., 1408
Queensland, *geochemistry*
Georgina Basin, phosphorite, genesis
Howard, P. F., 260
Radiometric age, *dates, igneous rocks*
granitic, Peru, Antamina, K/Ar
McKee, E. H., 928
volcanics, intrusives, Bolivia, tin belt
Grant, J. N., 838
volcanics, intrusives, Finland, Pyhasalmi, Pb/U
Helovuori, O., 1084
Radiometric age, *dates, ore deposits*
Finland, Vammala, copper-nickel, Pb/U
Hakli, T. A., 1166
Finland, Ylojarvi, copper-tungsten, Pb/U
Himmi, R., 1183
Idaho, Montana, porphyry molybdenum, K-Ar
Schmidt, E. A., 698
Armstrong, R. L., 699
Mauritania, iron-formation
Bronner, G., 77
Mexico, northern, Pb/Pb
Cumming, G. L., 1395
New Zealand, molybdenum, K-Ar
Eggers, A. J., 628
Panama, Cerro Colorado, porphyry copper, K-Ar
Spatz, D. M., 693
Clark, A. H., 695
Portugal, Panasqueira, K/Ar, fission-track
Kelly, W. C., 1721
Wyoming, Gas Hills, Crooks Gap, Pb/U
Ludwig, K. R., 1654
Yukon Territory, Minto, K/Ar
Pearson, W. N., 1577
Radiometric age, *interpretation*
time scale, Archean, United States
Peterman, Z. E., 1544
Rare earths, *deposits*
Colorado, Wet Mountains
Armbrustmacher, T. J., 888
Rare earths, *geochemistry*
Ontario, Sudbury, abundance cf. differentiates
Kuo, H. Y., 590
Remobilization *See* Metamorphism, mass transfer
Remote sensing *See* Mineral exploration, geophysical methods
Reviewers of manuscripts
list, 515
Reviews
Atlas of Economic Mineral Deposits (Dixon), Skinner 1533
Atlas of Structures and Textures of the Volcanogenic-Sediment ary Iron Ores of Altai (Kalugin), Alexandrov 171
Atlas Photographique des Mineraux D'Alluvions (Devismes), Skinner 706
Copper Mining and Management (Navin), Wilson 956
Fluvial Sedimentology (Miall, ed.), Klein 1534
Geochemical Exploration 1978. Proceedings of the Seventh International Geochemical Exploration Symposium (Watterson and Theobald, eds.), Hawkes 1533
Geochemistry (Brownlow), Anderson 955
Geological Studies of the Mineral Deposits in Japan and East Asia (Imai and Others), Skinner 706
Geology and Hematite Deposits of South Cumbria (Rose and Dunham), Ineson 954
International Molybdenum Encyclopaedia 1778-1978. Volume I, Resources and Production (Sutolov, ed.), Blair 1898
Introduction to Geochemistry, 2nd Ed. (Krauskopf), Seyfried 956
Island Arcs, Deep Sea Trenches and Back Arc Basins (Talwani and Pitman, eds.), Sawkins 169
La Ceinture Sud-Iberique a Amas Sulfures dans sa Partie Espagnole Mediane (Routhier, Aye, Boyer, Lecolle, Picot, Moliere, and Roger), Jenks 705
Marine Evaporites (Deal and Shreiber, eds.), Bodine 496
Mechanics of Sediment Movement (Middleton and Southard), Gordon 497
Metallization Associated with Acid Magmatism, Volume 3 (Stemprok, Burnol, and Tischendorf, eds.), Skinner 706
Metallogeny of the Ukraine and Moldavia (Belevtsev, Ed.), Alexandrov 170
Mineral Chemistry of Metal Sulfides (Vaughan and Craig), Potter 166
Mineral Deposits of Europe. Volume I: Northwest Europe (Bowie, Kvalheim, and Haslam, eds.), Skinner 1315
Muscovite Pegmatites and Rare Metals—Muscovite Pegmatites (Shmakin), Alexandrov 170
Natural Zeolites: Occurrence, Properties, Use (Sand and Mumpton, eds.), Smith 498
Paleocurrents and Basin Analysis (Potter and Pettijohn), Minter 704
Precis de Mineralogie (Aubert, Guillemin, and Pierrot), Skinner 959
Principles of Metallogenic Analysis (Shcheglov), Alexandrov 169
Principles of Sedimentology (Friedman and Sanders), Belt 497
Proceedings of the Second International Kimberlite Conference. Vol. I. Kimberlites, Diatremes, and Diamonds: Their Geology, Petrology, and Geochemistry. Vol. II. The Mantle Sample: Inclusions in Kimberlites and Other Volcanics (Boyd and Meyer, eds.), Skinner 959
Prospecting and Exploration of Mineral Deposits (Kuzvart and Bohmer), Patterson 704

Prospecting in Areas of Glaciated Terrain 1979 (Institution of Mining and Metallurgy), Skinner 1899
Reflection Seismology—A Tool for Energy Resource Exploration (Waters), Dobrin 168
Rock-Forming Minerals. Vol. 2A. Single-Chain Silicates. 2nd Ed. (Deer, Howie, and Zussman), Skinner 958
Secondary Aureoles of Dispersion and Dispersion in Streams (Polikarpochkin), Alexandrov 171
The Chemistry of the Atmosphere and Oceans (Holland), Dasch 952
The Metallogeny of Mercury (Metallogeniia rtuti) (Smirnov, Kuznetsov, and Fedorchuk, eds.), Bailey and Vitaliano 166
The Mississippi River Delta. Legal-Geomorphologic Evaluation of Historic Shoreline Changes (Morgan), Bloom 1532
The Off-Shore Petroleum Resources of South-East Asia (Siddayao), Meyerhoff 954
The Origins of Sediments and Sedimentary Rocks (Sedimentary Petrology. Part III) (von Englehardt, translated by Johns), Siever 168
The United States and the Global Struggle for Minerals (Eck 1898es), Park
The Wolfson Geochemical Atlas of England and Wales (Webb et al.), Nichol 952
Uranium Deposits. Their Mineralogy and Origin (Kimberly, ed.), Adams 957
Zoning in Endogenous Ore Deposits (Rundquist and Nezhenskiy), Alexandrov 170

Rhodesia, *deposits*
barite, sedimentary, Archean
Thorpe, R. I., 700

Romania, *deposits*
polymetallic ores
Lang, B., 1336

Sardinia, *deposits*
iron, San Leone, magnetite skarn, petrology
Verkaeren, J., 53

Saskatchewan, *deposits*
potash, stratigraphy
Worsley, N., 377

Sea water, *geochemistry*
metals, abundance cf. black shales
Holland, H. D., 1676

Sedimentary rocks, *composition*
black shales, metals, enrichment
Holland, H. D., 1676

Sedimentary rocks, *lithofacies*
Florida, general, phosphorites
Riggs, S. R., 285

Sedimentary rocks, *iron-formation See* Iron-formation

Sedimentary structures, *miscellaneous*
banding, strata-bound sulfides, cyclic
Finlow-Bates, T., 1408
banding, textures, iron-formation, Mauritania
Bronner, G., 77
general, host sandstone, Sweden, Laisvall
Rickard, D. T., 1255
general, host sandstone, Sweden, Vassbo
Christofferson, H. C., 1239
general, modern stream cf. auriferous conglomerate
Button, A., 1876

Sierra Leone, *deposits*
general, exploration, review
Morel, S. W., 1563

Sierra Leone, *geochemistry*
Freetown Complex, geochemical prospecting
Davies, T. C., 638

Silver, *deposits.*
(*See also* Base metals-silver; Polymetallic ores; Strata-bound deposits, lead-zinc-silver)

Skarn, *geochemistry*
ore-forming fluids, composition, Mexico
Erwood, R. J., 95

Skarn deposits
Peru, Antamina, copper, zinc, molybdenum
McKee, E. H., 928
Sardinia, San Leone, magnetite, petrology
Verkaeren, J., 53
Sweden, tungsten, mineralogy, geochemistry
Ohlsson, L. G., 1012

Society of Economic Geologists
A.G.I. Minority Program scholarships, announcement, 1911
announcements, 190, 514, 731, 973, 1325, 1541, 1719
distinguished lecture in scientific research, *Geochronology and the Archean of the United States,* Peterman, 1544
field conference, Tucson, April, 1979, announcement, 189
Lindgren award, announcement, 189
Lindgren Award, award to Steven D. Scott, 730, 973
meeting, fall, with GSA, San Diego, Calif., Nov. 5-8, 1979, announcement, 1325
notes and news, 731, 1325
officers, 1979, biographies, 1324
Penrose Medal, award to Paul Ramdohr, 728, 973
Presidential Address, *The Art of Exploration,* Muessig, 732
report, Nominating Committee, 728
S.E.G. Foundation, announcements, 1910
Society of Economic Geologists Medal, announcement, 731
Stratigraphic Code Revision, notice, 974
Thayer Lindsley Distinguished Lecturers for 1979-80, 730

Soils
caliche, paleoclimatic significance
McLeod, M. J., 1529
van de Poll, H. W., 1530
geochemistry, profiles, bauxite
Grubb, P. L. C., 735

Solubility
copper, sulfate, boiling environment
Sondergeld, C. H., 109
lead, bisulfide solutions
Giordano, T. H., 1637

Solution features
potash deposits, dissolution, detection
Worsley, N., 377

Source rocks
copper, Yukon Territory, Dolores Creek, diorite dikes
Laznicka, P., 1352
fluorspar, Idaho, Bayhorse
Hoagland, A. D., 164
uranium, Colorado, Schwartzwalder mine
Bird, A. G., 947
zinc, black shales, Missouri, Kansas
Coveney, R. M., Jr., 131

South Africa, *deposits*
barite, Barberton Mountain Land
Thorpe, R. I., 700
gold, Klerksdorp, grain morphology, fineness
Utter, T., 27

South Africa, *geochemistry*
Messina, copper, isotopes, fluid inclusions
Sawkins, F. J., 684

Spain, *deposits*
iron, Ponferrada-Astorga, oolitic ore
Lunar, R., 751

Spain, *geochemistry*
Malaga, chromite, compositions
Oen, I. S., 1630

Special issues, *prefaces*
ore deposits, Finland, Norway, Sweden
Frietsch, R., 975
phosphate, potash, and sulfur deposits
Skinner, B. J., 191

Spectroscopy
laser microprobe, fluid inclusions
Tsui, T. F., 1647
visible and near infrared, analysis, remote sensing
Hunt, G. R., 1613

Sri Lanka, *deposits*
nickel, iron, plate boundary
Munasinghe, T., 1495

Statistical methods, *geochemistry*
copper vs. gold, silver, regression analysis
Pearson, W. N., 1577
elements, correlations, factor analysis
Helovuori, O., 1084
Hakli, T. A., 1166
mercury, massive sulfide, linear correlation
Ryall, W. R., 1471
metals, correlations, factor analysis
Inkinen, O., 1153
Himmi, R., 1183
metals, sedimentation, Markov analysis
Finlow-Bates, T., 1408
phosphorite, element correlations
Howard, P. F., 260

Strata-bound deposits, *base-metals*
Finland, Aijala-Orijarvi, massive sulfide
Latvalahti, U., 1035
general, submarine effusion, models
Solomon, M., 797
general, submarine systems, review
Henley, R. W., 1600
New Brunswick, Bathurst, caldera complex
Harley, D. N., 786

Strata-bound deposits, *copper*
Greenland, Isua, sulfur isotopes
Appel, P. W. U., 45
Strata-bound deposits, *copper-zinc*
Finland, Pahtavouma, uraniferous
Inkinen, O., 1153
Finland, Pyhasalmi, lead isotopes
Helovuori, O., 1084
Finland, Pyhasalmi-Pielavesi, metamorphism
Huhtala, T., 1069
Manitoba, Ruttan, geobarometry
Bristol, C. C., 1496
Sweden, Skellefte, mercury geochemistry
Widenfalk, L., 1307
Strata-bound deposits, *fluorspar*
Idaho, Bayhorse, genesis
Hoagland, A. D., 164
Strata-bound deposits, *general*
ocean floor, ore fluids, effusion
Jones, H., 1894
Turner, J. S., 1895
paleoclimatic controls
McLeod, M. J., 1529
van de Poll, H. W., 1530
Strata-bound deposits, *gold*
general, organic material, Precambrian cf. modern
Button, A., 1876
Strata-bound deposits, *iron*
Iran, Mishdovan, magnetite flows
Foerster, H., 1485
Spain, Ponferrada-Astorga, oolitic ore
Lunar, R., 751
Strata-bound deposits, *iron-manganese*
Sweden, Langban, geochemistry
Bostroem, K., 1002
Strata-bound deposits, *lead-zinc*
Mississippi Valley, solution chemistry
Giordano, T. H., 1637
Sweden, Laisvall, isotopes, fluid inclusions
Rickard, D. T., 1255
Sweden, Vassbo, ore controls
Christofferson, H. C., 1239
Strata-bound deposits, *lead-zinc-silver*
New South Wales, Broken Hill, structure
Stanton, R. L., 1890
Laing, W. P., 1892
Northern Territory, geochemistry
Scott, K. M., 1693
Williams, N., 1695
Finlow-Bates, T., 1697
Williams, N., 1699
Queensland, Mount Isa, cyclic deposition
Finlow-Bates, T., 1408
Strata-bound deposits, *manganese*
Costa Rica, Nicoya, ophiolite, volcanogenesis
Kuypers, E. P., 672
Strata-bound deposits, *pyrite*
Sweden, Asen, sulfur isotopes
Rickard, D. T., 1060
Strata-bound deposits, *uranium*
Finland, Vihanti, phosphorite
Rehtijarvi, P., 1102
Strata-bound deposits, *barite See* Barite, deposits
Strata-bound deposits, *iron.*
(*See also* Iron-formation)
Strata-bound deposits, *lead-zinc.*
(*See also* Strata-bound deposits, base metals)
Strata-bound deposits, *pyrite See* other categories of strata-bound deposit; many are dominantly pyritic
Strata-bound deposits, *uranium.*
(*See also* Uranium, deposits, sandstone-type)
Strata-bound deposits, *zinc.*
(*See also* Strata-bound deposits, base metals; Strata-bound deposits, copper-zinc; Strata-bound deposits, lead-zinc)
Strata-bound deposits, *zinc-copper See* Strata-bound deposits, copper-zinc
Strata-bound deposits, *zinc-lead See* Strata-bound deposits, lead-zinc
Strontium, *geochemistry See* Isotopes, strontium
Structural controls, *miscellaneous deposits*
carbonatite complex, Finland
Vartiainen, H., 1296
fluorspar, lead-zinc, barite, Mississippi Valley
Brecke, E. A., 1327
Structural controls, *porphyry-type*
molybdenum, Norway, cauldron subsidence
Geyti, A., 1211
Structural controls, *theory*
lineaments, ore association, review
Marshall, B., 942
Structural controls, *veins*
Philippines, Baguio, gold
Fernandez, H. E., 1852
Philippines, Baguio, gold, ore shoots
Fernandez, H. E., 606
Portugal, Panasqueira, tin-tungsten
Kelly, W. C., 1721
Romania, polymetallic ores
Lang, B., 1336
Structural geology, *methods*
minicomputer cartographic program
Floden, T., 1250
Structural geology, *methods See* Deformation; Mineral exploration, structural guides
Sulfur, *deposits*
general, classification, biogenesis
Ruckmick, J. C., 469
general, sources, supply, demand, review
Bodenlos, A. J., 459
general, special issue, preface
Skinner, B. J., 191
Iraq, Mishraq mine, structure, stratigraphy
Barker, J. M., 484
Poland, genesis, exploration
Pawlowski, S., 475
Texas, borehole gravity survey
Schmoker, J. W., 1462
Texas, Gulf of Mexico, salt domes, biogenesis
Davis, J. B., 462
Sulfur, *geochemistry*
sulfur-carbon ratios, strata-bound deposit, interpretation
Scott, K. M., 1693
Williams, N., 1695
Finlow-Bates, T., 1697
Williams, N., 1699
Sulfur, *geochemistry.*
(*See also* Isotopes, sulfur; Phase equilibria)
Supergene processes, *geochemistry*
mercury, massive-sulfide deposit
Ryall, W. R., 1471
Supergene processes, *weathering*
bauxite, genesis, SEM textural study
Keller, W. D., 116
bauxite, polygenetic, Guianas, Brazil
Grubb, P. L. C., 735
bauxite, trace elements, mobility
Kronberg, B. I., 1869
carbonatite, apatite concentration, Ontario
Erdosh, G., 331
phosphate, Florida
Riggs, S. R., 195
Surinam, *deposits*
bauxite, complex origin
Grubb, P. L. C., 735
Sweden, *deposits*
copper-zinc, Skellefte, mercury geochemistry
Widenfalk, L., 1307
general, review
Frietsch, R., 975
iron, Kiruna district, apatite ores
Lundberg, B., 1131
lead-zinc, Laisvall
Rickard, D. T., 1255
lead-zinc, Vassbo
Christofferson, H. C., 1239
pyrite-barite, Asen, strata-bound, sulfur isotopes
Rickard, D. T., 1060
tungsten, central, mineralogy, geochemistry
Ohlsson, L. G., 1012
uranium, Duobblon, ignimbrite
Lindroos, H., 1118
Sweden, *geochemistry*
Langban, cf. marine exhalative deposits
Bostroem, K., 1002
Tasmania, *deposits*
base-metals, Rosebery, submarine effusion
Solomon, M., 797
Tectonics, *plate See* Plate tectonics
Tennessee, *deposits*
copper, Ducktown, sphalerite geobarometry
Ringler, R. W., 937
Tennessee, *geochemistry*
zinc district, dolomite microstratigraphy
Ebers, M. L., 908
Texas, *deposits*
molybdenum, Cave Peak, breccia pipe
Sharp, J. E., 517
sulfur, Culberson County, borehole gravity
Schmoker, J. W., 1462
sulfur, salt domes, biogenesis
Davis, J. B., 462
Thailand, *deposits*
potash, geochemistry
Hite, R. J., 448
Thermal waters, *geochemistry*
composition, gold district, Philippines
Sawkins, F. J., 1420
submarine systems, P-T conditions
Henley, R. W., 1600

Thermal waters, *occurrence*
New Zealand, temperature inversion
Grant, M. A., 702
ocean floor, general, models
Jones, H., 1894
Turner, J. S., 1895
Thorium, *geochemistry*
abundance, Th/U ratios, Sweden, Langban
Bostroem, K., 1002
Tin, *deposits*
Finland, Eurajoki, fluid inclusions
Haapala, I., 1231
Tin-tungsten, *deposits*
Bolivia, K/Ar ages
Grant, J. N., 838
Portugal, Panasqueira, fluid inclusions, isotopes
Kelly, W. C., 1721
Texas, breccia pipe, zoning
Sharp, J. E., 517
Trace-element analyses, *alteration suites*
bauxite, Brazil
Kronberg, B. I., 1869
Trace-element analyses, *minerals*
magnetite, Sweden, Kiruna district
Lundberg, B., 1131
Trace-element analyses, *ores*
copper-zinc, uranium, Sweden
Inkinen, O., 1153
phosphorite, Australia, northern
Howard, P. F., 260
Trace-element analyses, *rocks*
breccia pipes, fragments, matrix
Knutson, J., 814
carbonatite, Colorado, Wet Mountains
Armbrustmacher, T. J., 888
Tungsten, *deposits*
Finland, Ylojarvi, mineralogy, geochemistry
Himmi, R., 1183
Sweden, central, skarns, veins
Ohlsson, L. G., 1012
Tungsten, *deposits.*
(*See also* Tin-tungsten, deposits)
United Arab Emirates, *deposits*
copper, Oman Mountains
Hassan, M. A., 919
Uranium, *deposits*
Colorado, Schwartzwalder mine, genesis
Bird, A. G., 947
Finland, Pahtavuoma, strata-bound copper-zinc, association
Inkinen, O., 1153
Finland, Vihanti, phosphorite
Rehtijarvi, P., 1102
Ontario, Elliot Lake, size cf. Witwatersrand
Mehliss, A. T. M., 1702
Robertson, D. S., 1702
Sweden, Duobblon, ignimbrite
Lindroos, H., 1118
Yukon Territory, Dolores Creek
Laznicka, P., 1352
Uranium, *deposits, sandstone-type*
Wyoming, Gas Hills, Crooks Gap, Pb/U age
Ludwig, K. R., 1654
Uranium, *geochemistry*
abundance, Th/U ratios, Sweden, Langban
Bostroem, K., 1002
transport, fixation, ignimbrite, Sweden
Lindroos, H., 1118
Uranium, *deposits.*
(*See also* Uranium deposits, sandstone-type; Strata-bound deposits, uranium)
U.S.S.R., *deposits*
phosphates, igneous, review
Notholt, A. J. G., 339
Utah, *geochemistry*
Drum Mountains, gold, stable isotopes
O'Neil, J. R., 852
Veins, *genesis*
Montana, Butte, copper
Brimhall, G. H., Jr., 556
Philippines, Baguio, gold
Fernandez, H. E., 606
Fernandez, H. E., 1852
Portugal, Panasqueira, tin-tungsten
Kelly, W. C., 1721
Virginia, *deposits*
massive sulfide, Gossan Lead
Henry, D. K., 645
Volcanoes
New Brunswick, caldera, massive-sulfide deposits
Harley, D. N., 786
Volcanogenesis
manganese, Costa Rica, ophiolite complex
Kuypers, E. P., 672
massive sulfide, Norway
Pouit, G., 1895
Geis, H. P., 1896
ocean floor, vents, models, experimental
Jones, H., 1894
Turner, J. S., 1895
strata-bound copper, Greenland
Appel, P. W. U., 45
strata-bound copper-zinc, uraniferous, Sweden
Inkinen, O., 1153
strata-bound iron, Iran, Mishdovan
Foerster, H., 1485
strata-bound iron, Sweden, Kiruna
Lundberg, B., 1131
strata-bound pyrite-barite, Sweden, Asen
Rickard, D. T., 1060
uraniferous phosphorite, Finland
Rehtijarvi, P., 1102
Volcanogenesis.
(*See also* Kuroko deposits; Massive sulfide deposits, volcanogenic)
Water, *geochemistry*
metals, analysis, X-ray fluorescence
Hubert, A. E., 1669
Water, *geochemistry.*
(*See also* Thermal waters; Sea water)
Weathering *See* Supergene processes, weathering
Western Australia, *geochemistry*
Redross, nickel, experimental study
McQueen, K. G., 140
Wyoming, *deposits*
uranium, Gas Hills, Crooks Gap, Pb/U age
Ludwig, K. R., 1654
Wyoming, *geochemistry*
general, radiometric ages, Archean
Peterman, Z. E., 1544
Yukon Territory, *deposits*
copper, cobalt, Dolores Creek
Laznicka, P., 1352
copper, Minto
Pearson, W. N., 1577
Zeolites, *deposits*
Mexico, Magdalena
Lefond, S. J., 1883
Zinc, *deposits*
Tennessee, dolomite microstratigraphy
Ehers, M. L., 908
Zinc, *geochemistry*
abundance, black shales, Missouri, Kansas
Coveney, R. M., Jr., 131
Zinc, *deposits.*
(*See also* Base metals; Kuroko deposits; Lead-zinc; Polymetallic ores; Strata-bound deposits)
Zinc-lead *See* Lead-zinc

ECONOMIC GEOLOGY

AND THE

BULLETIN OF THE SOCIETY OF ECONOMIC GEOLOGISTS

EDITOR: BRIAN J. SKINNER
Yale University, New Haven, Connecticut 06520

BUSINESS EDITOR: DONALD M. DAVIDSON
University of Texas at El Paso, El Paso, Texas 79968

EDITORIAL BOARD

Through 1979

ZELL E. PETERMAN, *Denver, Colorado*
D. A. PRETORIUS, *Johannesburg, South Africa*
J. DAVID LOWELL, *Tucson, Arizona*

Through 1980

G. M. ANDERSON, *Toronto, Canada*
LEWIS B. GUSTAFSON, *Canberra, Australia*
WILLIAM C. KELLY, *Ann Arbor, Michigan*

Through 1981

SAMUEL S. ADAMS, *Denver, Colorado*
HEIKKI PAPUNEN, *Turku, Finland*
WILLIAM C. PRINZ, *Reston, Virginia*

Through 1982

J. M. FRANKLIN, *Ottawa, Canada*
FRANK LESURE, *Reston, Virginia*
TAKEO SATO, *Tokyo, Japan*

Through 1983

MARCO T. EINAUDI, *Stanford, California*
ARTHUR W. ROSE, *University Park, Pennsylvania*
GARY P. LANDIS, *Denver, Colorado*

EDITORIAL ASSISTANTS

NANCY A. AHLSTROM
WINIFRED KOTCHIAN
VIRGINIA LEE KRIGBAUM
MABEL PETERSON
WANDA STARK
ELIZABETH G. WEINMAN

VOLUME 74

NEW HAVEN, CONNECTICUT

THE ECONOMIC GEOLOGY PUBLISHING COMPANY

1979

SOCIETY OF ECONOMIC GEOLOGISTS

THE PUBLICATIONS OF WHICH CONSTITUTE A PART OF THIS JOURNAL

OFFICERS FOR 1979

(April 1, 1979 to December 31, 1979)

PAUL B. BARTON, *President*
U. S. Geological Survey
National Center, Stop 959
Reston, Virginia 22092

J. O. KALLIOKOSKI, *President-Elect*

S. CYRUS CREASEY, *Vice-President-Elect*

JOHN M. GUILBERT, *Vice-President for Regional Affairs*

WILLIAM C. KELLY, *Vice-President*
Dept. of Geology and Mineralogy
University of Michigan
Ann Arbor, Michigan 48104

RALPH W. MARSDEN, *Treasurer*
University of Minnesota—Duluth
Duluth, Minnesota 55812

ARNOLD L. BROKAW, *Secretary*
185 Estes Street
Denver, Colorado 80226

JOHN D. WELLS, *Membership Secretary*
U. S. Geological Survey
National Center, Stop 913
Reston, Virginia 22092

Regional Vice-Presidents

DESMOND A. PRETORIUS, Africa, Johannesburg

CHIKAO NISHIWAKI, Asia, Shisouka-Ken

PETER HOWARD, Australia, Sydney

JOHN WEBB, Europe, London

ALAN M. GOODWIN, North America, Toronto

ALBERTO BENAVIDES, South America, Lima

Councilors

1977–79
GEORGE A. BARBER
JACK E. HARRISON
ANTHONY J. NALDRETT

1978–80
C. WAYNE BURNHAM
J. JULIAN HEMLEY
VICTOR F. HOLLISTER

1979–81
MURIEL MATHEZ
MARCO T. EINAUDI
ROBERT D. NININGER

Past-President:
SIEGFRIED MUESSIG

Past-Vice-President:
STEWART R. WALLACE

Société de Géologie Appliquée aux Gites Mineraux

President:
P. ROUTHIER

Secretary:
A. EMBERGER

Economic Geology Publishing Company

President:
GEORGE E. BECRAFT

Editor:
BRIAN J. SKINNER

Business Editor:
DONALD M. DAVIDSON

COMMITTEES

Executive Committee
PAUL B. BARTON, *Chairman*
GEORGE E. BECRAFT
ARNOLD L. BROKAW
J. O. KALLIOKOSKI
WILLIAM C. KELLY
RALPH W. MARSDEN
SIEGFRIED MUESSIG

Admissions Committee
GEORGE A. BARBER, 1977–79, *Chairman*
MAURICE A. CHAFFEE, 1979–81
HENRY LEPP, 1977–79
WILLIAM N. MCANULTY, 1978–80

Committee on Committees
VICTOR F. HOLLISTER, *Chairman*
PHILIP M. BETHKE
ROBERT HERON CARPENTER

Committee for Information on Mineral Programs
DONALD L. EVERHART, 1979–81, *Chairman*
ROBERT W. BOYLE, 1979–81
J. DAVID LOWELL, 1977–79
PIERCE D. PARKER, 1978–80
RICHARD P. SHELDON, 1978–80
BRIAN J. SKINNER, 1977–79

Program Policy Committee
STEWART R. WALLACE, *Chairman* (ex officio)
S. CYRUS CREASEY (ex officio)
WILLIAM C. KELLY (ex officio)
BRUCE R. DOE (ex officio)
RICHARD L. NIELSEN (ex officio)
ROBERT G. BLAIR
A. R. RENFRO
G. L. KROL
ARNOLD L. BROKAW (ex officio)

Program Chairmen:
EUGENE M. SHOEMAKER, Fall Meeting 1979, San Diego
DEVERLE P. HARRIS, Winter Meeting 1980, Las Vegas
NORMAN HERZ, Fall Meeting 1980, Atlanta
DONALD T. MCMILLAN, Winter Meeting 1981, Chicago
STEPHEN E. KESLER, Fall Meeting 1981, Cincinnati
PAUL E. MELANCON, Winter Meeting 1982, Dallas

Finance Committee
RICHARD C. ELLETT, *Chairman*
MURIEL MATHEZ
ROBERT S. MOEHLMAN
WALTER R. SIEBERT, JR.
THOMAS N. WALTHIER
RALPH W. HARSDEN (ex officio)

Lindgren Award Committee
EDWIN W. TOOKER, 1979–81, *Chairman*
PETER R. BUSECK, 1977–79
PAUL E. GERDEMANN, 1979–80
R. W. HUTCHINSON, 1978–80
SPENCER R. TITLEY, 1977–79
AKIO TSUSUE, 1979–81

Nominating Committee
C. WAYNE BURNHAM, *Chairman*
FINLEY A. CAMPBELL
GERALD K. CZAMANSKE

Penrose Medal Committee
H. D. HOLLAND, 1979–81, *Chairman*
J. O. KALLIOKOSKI, 1977–79
J. DAVID LOWELL, 1978–80
CHARLES MEYER, 1977–79
BRIAN J. SKINNER, 1979–80
FRANK M. VOKES, 1979–81

Publications Committee
RICHARD L. NIELSEN, 1977–79, *Chairman*
ALLEN F. AGNEW, 1978–80
W. L. FISHER, 1977–79
G. E. MCKELVEY, 1979–81
CHARLES P. MILLER, 1978–80
S. D. SCOTT, 1979–81

Research Committee
BRUCE R. DOE, 1978–80, *Chairman*
S. A. ANZALONE, 1978–80
CHARLES G. CUNNINGHAM, 1979–81
J. JAMES EIDEL, 1977–79
MARCO T. EINAUDI, 1979–81
RICHARD P. FISCHER, 1978–80
C. N. HOLMES, 1977–79
JOHN W. TRAMMELL, 1979–81
LAUREN A. WRIGHT, 1977–79
ARNOLD L. BROKAW (ex officio)
STEWART R. WALLACE (ex officio)

Society of Economic Geologists Medal Committee
E. N. CAMERON, 1979–80, *Chairman*
L. J. CABRI, 1979
J. E. HARRISON, 1979
E. L. OHLE, 1979–81
P. A. RIDDELL, 1979–81
A. W. ROSE, 1979–80

Thayer Lindsley Visiting Lecturer Committee
STEVEN E. KESLER, 1977–79, *Chairman*
DAVID C. JONSON, 1978–80
J. THOMAS NASH, 1978–80
DAVID S. ROBERTSON, 1979–81
G. G. SNOW, 1979–81
CLAY T. SMITH, 1977–79, *Secretary*
Geology Department
New Mexico Institute of Mining and Technology
Socorro, New Mexico 87801

CONTENTS OF VOLUME 74

Number 1

Genesis of Ore Deposits in the San Juan Volcanic Field, Southwestern Colorado—Lead Isotope Evidence ..... *B. R. Doe, T. A. Steven, M. H. Delevaux, J. S. Stacey, P. W. Lipman, and F. S. Fisher* 1

The Morphology and Silver Content of Gold from the Upper Witwatersrand and Ventersdorp Systems of the Klerksdorp Gold Field, South Africa ..... *T. Utter* 27

Stratabound Copper Sulfides in a Banded Iron-Formation and in Basaltic Tuffs in the Early Precambrian Isua Supracrustal Belt, West Greenland ..... *Peter W. Uitterdijk Appel* 45

Petrology of the San Leone Magnetic Skarn Deposit (S. W. Sardinia) ..... *J. Verkaeren and P. Bartholomé* 53

Alteration and Mineralization Associated with a Vesicular Dike near Yeoval in New South Wales, Australia ..... *Edward P. Ambler* 67

Precambrian Banded Iron-Formations of the Ijil Group (Kediat Ijil, Reguibat Shield Mauritania) ..... *G. Bronner and J. J. Chauvel* 77

Compositionally Distinct, Saline Hydrothermal Solutions, Naica Mine, Chihuahua, Mexico ..... *Robin J. Erwood, Stephen E. Kesler, and Paul L. Cloke* 95

A Laboratory Study of Mineral Deposition in a Boiling Environment ..... *Carl H. Sondergeld and D. L. Turcotte* 109

Bauxitization of Syenite and Diabase Illustrated in Scanning Electron Micrographs . . *W. D. Keller* 116

Scientific Communications

Transported Altered Wall Rock in Laharic Breccias at the Cariboo-Bell Cu-Au Porphyry Deposit, British Columbia ..... *D. G. Bailey and C. Jay Hodgson* 125

Strontium Isotope Compositions of Rocks from the Disputada Copper Mine, Chile ..... *Martin Halpern* 129

Sphalerite Concentrations in Mid-Continent Pennsylvania Black Shales of Missouri and Kansas ..... *Raymond M. Coveney, Jr.* 131

Experimental Heating and Diffusion Effects in Fe-Ni Sulfide Ore from Redross, Western Australia ..... *K. G. McQueen* 140

The Lead and Sulfur Isotopic Composition of Galena from a Mississippi Valley-type Deposit in the New Lead Belt, Southeast Missouri ..... *Dimitri A. Sverjensky, Danny M. Rye, and Bruce R. Doe* 149

Discussions

Formation Temperature of Fluorite in the Lockport Dolomite in Upper New York State as Indicated by Fluid Inclusion Studies—with a Discussion of Heat Sources—A Discussion ..... *S. J. Haynes and M. A. Mostaghel* 154

Formation Temperature of Fluorite in the Lockport Dolomite in Upper New York State as Indicated by Fluid Inclusion Studies—with a Discussion of Heat Sources—A Reply ..... *Gary L. Kinsland* 159

Geology of the Bayhorse Fluorite Deposit, Custer Counter, Idaho—A Discussion ..... *Alan D. Hoagland* 164

Reviews

Mineral Chemistry of Metal Sulfides (David J. Vaughan and James R. Craig) ..... *Robert W. Potter II* 166

The Metallogeny of Mercury (Metallogeniia rtuti) (V. I. Smirnov, V. A. Kuznetsov, and V. P. Fedorchuk, eds.) ..... *Edgar H. Bailey and Dorothy Vitaliano* 166

The Origins of Sediments and Sedimentary Rocks (Sedimentary Petrology, Part III) (Wolf von Englehardt, translated by William D. Johns) ..... *Raymond Siever* 168

Reflection Seismology—A Tool for Energy Resources Exploration (Kenneth H. Waters) ..... *Milton B. Dobrin* 168

Island Arcs, Deep Sea Trenches and Back Arc Basins (M. Talwani and W. C. Pitman III, eds.) ..... *Frederick J. Sawkins* 169

Principles of Metallogenic Analysis (A. D. Shcheglov) ..... *Eugene A. Alexandrov* 169
Muscovite Pegmatites and Rare Metals—Muscovite Pegmatites (B. B. Shmakin) ..... *Eugene A. Alexandrov* 170
Metallogeny of the Ukraine and Moldavia (Ya. N. Belevtsev, Ed.-in-Chief) ..... *Eugene A. Alexandrov* 170
Zoning in Endogenous Ore Deposits (D. V. Rundquist and I. A. Nezhenskiy) ..... *Eugene A. Alexandrov* 170
Secondary Aureoles of Dispersion and Dispersion in Streams (V. V. Polikarpochkin) ..... *Eugene A. Alexandrov* 171
Atlas of Structures and Textures of the Volcanogenic-Sedimentary Iron Ores of Altai (A. S. Kalugin) ..... *Eugene A. Alexandrov* 171
Books Received .. *Michael S. Binder, Jill Dill Pasteris, Kevin Shelton, and Dimitri A. Sverjensky* 172
Interesting Papers in Other Journals 176
Society of Economic Geologists 189

Number 2

AN ISSUE DEVOTED TO PHOSPHATE, POTASH, AND SULFUR

Preface ..... *B. J. S.* 191
Phosphate ..... *Peter F. Howard* 192
Petrology of the Tertiary Phosphate System of Florida ..... *Stanley R. Riggs* 195
Phosphate Occurrences on the Western and Southern Coastal Areas and Continental Shelves of Southern Africa ..... *A. O. Fuller* 221
Sechura Phosphate Deposits, Their Stratigraphy, Origin, and Composition ..... *T. M. Cheney, G. H. McClellan, and E. S. Montgomery* 232
On the Geochemistry and Origin of the D Tree, Wonarah, and Sherrin Creek Phosphorite Deposits of the Georgina Basin, Northern Australia ..... *Peter F. Howard and M. J. Hough* 260
Phosphorite Sedimentation in Florida—A Model Phosphogenic System ..... *Stanley R. Riggs* 285
A Reevaluation of the Spatial and Temporal Distribution of Sedimentary Phosphate Deposits in the Light of Plate Tectonics ..... *Peter J. Cook and Michael W. McElhinny* 315
The Ontario Carbonatite Province and Its Phosphate Potential ..... *George Erdosh* 331
The Economic Geology and Development of Igneous Phosphate Deposits in Europe and the USSR ..... *Arthur J. G. Notholt* 339
Potash ..... *John C. Dunlap and Robert J. Hite* 351
Potash and Politics ..... *Paul A. Rittenhouse* 353
Potash Salts in the Williston Basin, U.S.A. ..... *Sidney B. Anderson and Robert P. Swinehart* 358
The Potash-bearing Members of the Devonian Prairie Evaporite of Southeastern Saskatchewan, South of the Mining Area ..... *Neil Worsley and Anne Fuzesy* 377
Potash Salt Springs, New Brunswick ... *John P. Anderle, Keith S. Crosby, and David C. E. Waugh* 389
The Regional and Stratigraphic Context of Zechstein 3 and 4 Potash in the British Sector of the Southern North Sea and Adjoining Land Areas ..... *Denys B. Smith and Antony Crosby* 397
The Geology of the Boulby Mine ..... *P. J. E. Woods* 409
The Gabon and Congo Basins Salt Deposits ..... *P. A. C. deRuiter* 419
A Comparison of Evaporite Facies in the Late Paleozoic Amazon and the Middle Cretaceous South Atlantic Salt Basins ..... *Peter Szatmari, Renato S. Carvalho, and Ivan A. Simoes* 432
Potash Deposits of the Khorat Plateau, Thailand and Laos ..... *Robert J. Hite and Thawat Japakasetr* 448
Sulfur ..... *Alfred J. Bodenlos and Carmen P. Nelson* 459
Bioepigenetic Sulfur Deposits ..... *J. B. Davis and D. W. Kirkland* 462
Classification and Genesis of Biogenic Sulfur Deposits ..... *J. C. Ruckmick, B. H. Wimberly, and A. F. Edwards* 469
Geology and Genesis of the Polish Sulfur Deposits ... *S. Pawlowski, K. Pawlowska, and B. Kubica* 475
Economic Geology of the Mishraq Native Sulfur Deposit, Northern Iraq ..... *James M. Barker, D. E. Cochran, and Robert Semrad* 484

Reviews

Marine Evaporites (Walter E. Dean and B. Charlotte Shreiber, eds.)... *Marc W. Bodine, Jr.* 496
Principles of Sedimentology (G. M. Friedman and J. E. Sanders)..... *Edward S. Belt* 497
Mechanics of Sediment Movement (G. V. Middleton and J. B. Southard)..... *R. B. Gordon* 497
Natural Zeolites: Occurrence, Properties, Use (L. B. Sand and F. A. Mumpton, eds.)..... *J. V. Smith* 498
Books Received.. *Michael S. Binder, Jill Dill Pasteris, Kevin Shelton, and Dimitri Sverjensky* 499
Interesting Papers in Other Journals..... 504
Reviewers of Manuscripts..... 515
Announcements..... 514

Number 3

Cave Peak, a Molybdenum-Mineralized Breccia Pipe Complex in Culberson County, Texas..... *James E. Sharp* 517
D/H Ratios, Origins, and Evolution of the Ore-Forming Fluids for the Neogene Veins and Kuroko Deposits of Japan..... *Keiko Hattori and Hitoshi Sakai* 535
Lithologic Determination of Mass Transfer Mechanisms of Multiple-Stage Porphyry Copper Mineralization at Butte, Montana: Vein Formation by Hypogene Leaching and Enrichment of Potassium-Silicate Protore..... *George H. Brimhall, Jr.* 556
Rare Earth Elements in the Sudbury Nickel Irruptive: Comparison with Layered Gabbros and Implications for Nickel Irruptive Petrogenesis..... *H. Y. Kuo and J. H. Crocket* 590
Gold Ore Shoot Development in the Antamok Mines, Philippines..... *Henry E. Fernandez, Florian V. Damasco, and Luisito A. Sangalang* 606
Potassium-Argon Ages of Molybdenum Mineralization and Associated Granites at Bald Hill and Correlation with Other Molybdenum Occurrences in the South Island, New Zealand..... *A. J. Eggers and C. J. Adams* 628
Heavy Metal Distribution in Laterites, Southwest of Regent, Freetown Igneous Complex, Sierra Leone..... *T. C. Davies and T. W. Bloxam* 638
Ore Mineralogy of the Great Gossan Lead, Virginia..... *Donald K. Henry, James R. Craig, and M. Charles Gilbert* 645
Phase Relations in the Cu-Co-S System and Mineral Associations of the Carrollite ($CuCo_2S_4$)-Linnaeite (Co_3S_4) Series..... *James R. Craig, David J. Vaughan, and John B. Higgins* 657

Scientific Communications

Volcanic Exhalative Manganese Deposits of the Nicoya Ophiolite Complex, Costa Rica..... *Eric P. Kuypers and Percy Denyer Ch.* 672
Lead Isotope Data from Mineral Deposits of Southern New Mexico: A Reinterpretation..... *Thomas E. Ewing* 678
Additional Geochemical Data on the Messina Copper Deposits, Transvaal, South Africa..... *F. J. Sawkins and R. O. Rye* 684
Effect of Pressure on Chalcocite Phase Transitions..... *John D. Grace and Lewis H. Cohen* 689

Discussions

Potassium-Argon Age of the Cerro Colorado Porphyry Copper Deposit, Panama—A Discussion..... *David M. Spatz* 693
Potassium-Argon Age of the Cerro Colorado Porphyry Copper Deposit, Panama—A Reply..... *Alan H. Clark* 695
An Archean "Porphyry-type" Disseminated Copper Deposit, Timmins, Ontario—A Discussion..... *A. T. Griffis* 695
An Archean "Prophyry-type" Disseminated Copper Deposit, Timmins, Ontario—A Reply.. *J. F. Davies and L. E. Luhta* 697
K-Ar Dates for Mineralization in the White Cloud-Cannivan Prophyry Molybdenum Belt of Idaho and Montana—A Discussion..... *Eberhard A. Schmidt, Joseph E. Worthington, and Richard W. Thomssen* 698
K-Ar Dates for Mineralization in the White Cloud-Cannivan Porphyry Molybdenum Belt of Idaho and Montana—A Reply..... *R. L. Armstrong, V. F. Hollister, and J. E. Harakal* 699

A Sedimentary Barite Deposit from the Archean Fig Tree Group of the Barberton Mountain Land (South Africa)—A Discussion ..... *R. I. Thorpe* 700
Volatile and Precious Metal Zoning in the Broadlands Geothermal Field, New Zealand—A Discussion ..... *Malcolm A. Grant* 702
Potassium-Argon Ages of Some Bolivian Rocks—A Discussion ..... *J. N. Grant, C. Halls, W. Avila, and N. J. Snelling* 702

Reviews

Prospecting and Exploration of Mineral Deposits (Milos Kužvart and Miloslav Böhmer) ..... *Sam H. Patterson* 704
Paleocurrents and Basin Analysis (P. E. Potter and F. J. Pettijohn) ..... *W. E. L. Minter* 704
La Ceinture Sud-Ibérique à Amas Sulfurés dans sa Partie Espagnole Médiane. Mémoire du Bureau de Recherches Géologiques et Minères no. 94 (P. Routhier, F. Aye, C. Boyer, M. Lécolle, P. Picot, M. Molière, and G. Roger) ..... *William F. Jenks* 705
Geological Studies of the Mineral Deposits in Japan and East Asia (Hideki Imai and Others) ..... *B. J. S.* 706
Metallization Associated with Acid Magmatism, Volume 3 (M. Stemprok, L. Burnol, and G. Tischendorf, eds.) ..... *B. J. S.* 706
Atlas Photographique des Mineraux D'Alluvions (Pierre Devismes) ..... *B. J. S.* 706
Books Received ..... *Michael S. Binder, Jill Dill Pasteris, Kevin Shelton, and Dimitri Sverjensky* 716
Interesting Papers in Other Journals 721
Society of Economic Geologists 728
SEG Presidential Address: The Art of Exploration ..... *Siegfried Muessig* 732

Number 4

Genesis of Bauxite Deposits in the Lower Amazon Basin and Guianas Coastal Plain ..... *P. L. C. Grubb* 735
Mineralogy of the Oolitic Iron Deposits of the Ponferrada-Astorga Zone, Northwestern Spain ..... *R. Lunar and J. L. Amoros* 751
A Model for the Deposition of Cornwall-type Magnetite Deposits ..... *Hans P. Eugster and I-Ming Chou* 763
Metamorphism of Iron-Formation: Parageneses in the System Fe–Si–C–O–H ..... *B. Ronald Frost* 775
A Mineralized Ordovician Resurgent Caldera Complex in the Bathurst-Newcastle Mining District, New Brunswick, Canada ..... *David N. Harley* 786
The Formation of Massive Sulfide Deposits on the Sea Floor ..... *M. Solomon and J. L. Walshe* 797
Petrogenesis of the Copper-bearing Breccia Pipes, Redbank, Northern Territory, Australia ..... *Janice Knutson, John Ferguson, W. M. B. Roberts, T. H. Donnelly, and I. B. Lambert* 814
Lead Isotopic Compositions of Andean Igneous Rocks, Latitudes 26° to 29°S: Petrologic and Metallogenic Implications ..... *Robert H. McNutt, Alan H. Clark, and Marcos Zentilli* 827
K-Ar Ages of Igneous Rocks and Mineralization in Part of the Bolivian Tin Belt ..... *J. Nigel Grant, Christopher Halls, Waldo Avila Salinas, and Norman J. Snelling* 838
Stable Isotope Investigation of Gold-bearing Jasperoid in the Central Drum Mountains, Utah ..... *James R. O'Neil and G. Bryan Bailey* 852
Geochemistry of Biotite in the Santa Rita Porphyry Copper Deposit, New Mexico ..... *David C. Jacobs and William T. Parry* 860
Replacement and Primary Magnetic Carbonatites from the Wet Mountains Area, Fremont and Custer Counties, Colorado ..... *Theodore J. Armbrustmacher* 888
Plants as Indicators of Gold Mineralization at Watson Bar, British Columbia, Canada ..... *C. A. Girling, P. J. Peterson, and H. V. Warren* 902
Cathodoluminescent Microstratigraphy in Gangue Dolomite, the Mascot-Jefferson City District, Tennessee ..... *Michael L. Ebers and Otto C. Kopp* 908

Scientific Communications

Copper Mineralization in the Northern Part of Oman Mountains near Al Fujairah, United Arab Emirates ..... *Mamdouh A. Hassan and Jawad S. Al-Sulaimi* 919

Fluid Inclusion Studies of the Inguarán Copper-bearing Breccia Pipes, Michaocan, Mexico . . . . . *Frederick J. Sawkins* 924
Age of Prophyry Intrusion, Potassic Alteration, and Related Skarn Mineralization, Antamina District, Northern Peru . . . . . *Edwin H. McKee, Donald C. Noble, Daryl A. Scherkenbach, John W. Drexler, José Mendoza, and V. Raúl Dyzaguirre* 928
Temperature and Salinity of the Fluids Responsible for Minor Occurrences of Sphalerite in the Ozark Region of Missouri . . . . . *David L. Leach* 931
Sphalerite Geobarometry of the Calloway Mine, Ducktown, Tennessee . . . . *Robert W. Ringler* 937
The Lineament-Ore Association . . . . . *Brian Marshall* 942

Discussions

An Epigenetic Model for the Formation of the Schwartzwalder Uranium Deposit—A Discussion . . . . . *Allan G. Bird* 947
An Epigenetic Model for the Formation of the Schwartzwalder Uranium Deposit—A Reply . . . . . *R. Mark Maslyn* 948

Reviews

The Chemistry of the Atmosphere and Oceans (Heinrich D. Holland) . . . . . *E. Julius Dasch* 952
The Wolfson Geochemical Atlas of England and Wales (John S. Webb et al.) . . . . *Ian Nichol* 952
Geology and Hemitite Deposits of South Cumbria (W. C. C. Rose and K. C. Dunham) . . . . . *P. R. Ineson* 954
The Off-Shore Petroleum Resources of South-East Asia (Corazón Morales Siddayao) . . . . . *Arthur A. Meyerhoff* 954
Geochemistry (Arthur H. Brownlow) . . . . . *G. M. Anderson* 955
Introduction to Geochemistry, 2nd Ed. (Konrad B. Krauskopf) . . . . . *William E. Seyfried, Jr.* 956
Copper Mining and Management (Thomas R. Navin) . . . . . *John C. Wilson* 956
Uranium Deposits, Their Mineralogy and Origin (M. M. Kimberly, ed.) . . . *Samuel S. Adams* 957
Rock-Forming Minerals. Vol. 2A. Single-Chain Silicates. 2nd Ed. (W. A. Deer, R. A. Howie, and J. Zussman) . . . . . *B. J. S.* 958
Précis de Mineralogie (A. Aubert, C. Guillemin, and R. Pierrot) . . . . . *B. J. S.* 959
Proceedings of the Second International Kimberlite Conference. Vol. I. Kimberlites, Diatremes, and Diamonds: Their Geology, Petrology, and Geochemistry. Vol. II. The Mantle Sample: Inclusions in Kimberlites and Other Volcanics (F. R. Boyd and Henry A. O. Meyer, eds.) . . . . . *B. J. S.* 959
Books Received . . . *Michael S. Binder, Jill Dill Pasteris, Kevin Shelton, and Dimitri Sverjensky* 959
Interesting Papers in Other Journals 963
Society of Economic Geologists 973
Announcements 973
Stratigraphic Code Revision Notice 974

Number 5

A SPECIAL ISSUE DEVOTED TO MINERAL DEPOSITS IN FENNOSCANDIA

The Ore Deposits in Finland, Norway, and Sweden—a Review . . . . . *R. Frietsch, H. Papunen, and F. M. Vokes* 975
Långban—An Exhalative Sedimentary Deposit? . . *Kurt Boström, Harold Rydell, and Oiva Joensuu* 1002
Tungsten Occurrences in Central Sweden . . . . . *Lars-Göran Ohlsson* 1012
Cu-Zn-Pb Ores in the Aijala-Orijärvi Area, Southwest Finland . . . . . *Ulla Latvalahti* 1035
Sulfur Isotope Systematics in the Åsen Pyrite-Barite Deposits, Skellefte District, Sweden . . . . . *David T. Rickard, Hans Zweifel, and T. H. Donnelly* 1060
The Geology and Zinc-Copper Deposits of the Pyhäsalmi-Pielavesi District, Finland . . *T. Huhtala* 1069
Geology of the Pyhäsalmi Ore Deposit, Finland . . . . . *O. Helovuori* 1084
A Middle Precambrian Uranium- and Apatite-Bearing Horizon Associated with the Vihanti Zinc Ore Deposit, Western Finland . . . . . *Pentti Rehtijärvi, Olli Aikäs, and Markku Mäkelä* 1102
A Stratabound Uranium Occurrence within Middle Precambrian Ignimbrites at Duobblon, Northern Sweden . . . . . *Hardy Lindroos and John Smellie* 1118

Painirova and Mertainen Iron Ores: Two Deposits of the Kiruna Iron Ore Type in Northern Sweden ... *B. Lundberg and J. A. T. Smellie* 1131
Copper, Zinc, and Uranium Occurrences at Pahtavuoma in the Kittilä Greenstone Complex, Northern Finland ... *Osmo Inkinen* 1153
Vammala, A Nickel Deposit in Layered Ultramafite, Southwest Finland ... *T. A. Häkli, K. Vormisto, and E. Hänninen* 1166
Mineralogy and Metal Distribution in the Copper-Tungsten Deposit at Ylöjärvi, Southwest Finland ... *R. Himmi, M. Huhma, and T. A. Häkli* 1183
Characteristics of Igneous Intrusions and Various Wall Rocks in Some Precambrian Porphyry Copper-Molybdenum Deposits in Pohjanmas, Finland ... *G. Gaál and M. Isohanni* 1198
Bordvika—A Possible Porphyry Molybdenum Occurrence within the Oslo Rift, Norway ... *Asker Geyti and Hans Kristian Schønwandt* 1211
Fluid Inclusions Associated with a Metamorphosed Molybdenite Mineralization in Vest-Agder, South Norway ... *Jens Konnerup-Madsen* 1221
Fluid Inclusions in Cassiterite and Beryl in Greisen Veins in the Eurajoki Stock, Southwestern Finland ... *Ilmari Haapala and Kari Kinnunen* 1231
Mineralization Controls in the Sandstone Lead-Zinc Deposits at Vassbo, Sweden ... *H. C. Christofferson, B. Wallin, S. Selkman, and David T. Rickard* 1239
K:KART: A Minicomputer Program for Two- and Three-Dimensional Representations of Topographic and Isopach Maps ... *T. Flodén, B. G. Wallin, H. Lans, G. Sundin, and David T. Rickard* 1250
Studies on the Genesis of the Laisvall Sandstone Lead-Zinc Deposit, Sweden ... *David T. Rickard, M. Y. Willdén, N.-E. Marinder, and T. H. Donnelly* 1255
Nepheline Syenite on Stjernøy, Northern Norway ... *Hans Peter Geis* 1286
Geological Characteristics of the Sokli Carbonatite Complex, Finland ... *Heikki Vartiainen and Heikki Paarma* 1296

Scientific Communications

Mercury as an Indicator of Stratigraphy and Metamorphism in the Skellefte Ore District ... *Lennart Widenfalk* 1307

Reviews

Mineral Deposits of Europe. Volume I: Northwest Europe (S. H. Bowie, A. Kvalheim, and H. W. Haslam, Eds.) ... *B. J. S.* 1315
Books Received ... *Michael S. Binder, Jill Dill Pasteris, Kevin Shelton, and Dimitri Sverjensky* 1315
Interesting Papers in Other Journals ... 1318
Society of Economic Geologists ... 1324
Announcements ... 1325

Number 6

A Hydrothermal System in the Midcontinent Region ... *E. A. Brecke* 1327
The Base Metals-Gold Hydrothermal Ore Deposits of Baia Mare, Romania ... *Barbu Lang* 1336
Dolores Creek, Yukon—a Disseminated Copper Mineralization in Sodic Metasomatites ... *Peter Laznicka and Robin J. Edwards* 1352
New Data Concerning Proterozoic Volcanic Stratigraphy and Structure in Central Arizona and its Importance in Massive Sulfide Exploration ... *Ed DeWitt* 1371
Gravity and Aeromagnetic Anomalies over Basement Structure in the Rolla Quadrangle and the Southeast Missouri Lead District ... *Lindrith Cordell* 1383
Isotopic Composition in Mexican Mineral Deposits ... *George L. Cumming, Stephen E. Kesler, and D. Krstic* 1395
Cyclicity in the Lead-Zinc-Silver-bearing Sediments at Mount Isa Mine, Queensland, Australia, and Rates of Sulfide Accumulation ... *T. Finlow-Bates* 1408
Fluid Inclusion and Geochemical Studies of Vein Gold Deposits, Baguio District, Phillippines ... *F. J. Sawkins, J. R. O'Neil, and J. M. Thompson* 1420
Gas Hydrates in CO_2-bearing Fluid Inclusions and the Use of Freezing Data for Estimation of Salinity ... *Peter L. F. Collins* 1435
The Distribution and Isotopic Composition of Sulfur in Coals from the Illinois Basin ... *Fred T. Price and Y. N. Shieh* 1445

Interpretation of Borehole Gravity Surveys in a Native-Sulfur Deposit, Culberson County, Texas ..... *James W. Schmoker* 1462
Mercury Distribution in the Woodlawn Massive Sulfide Deposit, New South Wales .. *W. R. Ryall* 1471

Scientific Communications

Petrographic Observations on a Magnetite Deposit at Mishdovan, Central Iran ..... *Hansgeorg Förster and Ulrich Knittel* 1485
Large-Scale Circular Features in North Westland and West Nelson, New Zealand; Possible Structural Control for Porphyry Molybdenum-Copper Mineralization? .. *Alan J. Eggers* 1490
Is the Highland-Eastern Vijayan Boundary in Sri Lanka a Possible Mineralized Belt? ..... *Tissa Munasinghe and C. B. Dissanayake* 1495
Application of Sphalerite Geobarometry to Ores from the Ruttan Mine ..... *Calvert C. Bristol* 1496
The Influence of Silicate: Sulfide Ratios on the Geochemistry of Magmatic Sulfides ..... *I. H. Campbell and A. J. Naldrett* 1503
On the Relationship between Whole Rock Chemistry and Porphyry Copper Mineralization .. *Douglas R. Mason and P. Geoffrey Feiss* 1506

Discussions

Sourcelines, Sourceregions, and Pathlines for Fluids in Hydrothermal Systems Related to Cooling Plutons—A Discussion ..... *John A. McDonald* 1511
Sourcelines, Sourceregions, and Pathlines for Fluids in Hydrothermal Systems Related to Cooling Plutons—A Reply ..... *Denis Norton, R. B. Knapp, and R. N. V. Villas* 1513
Partitioning of Fe, Co, Ni, and Cu between Sulfide Liquid and Basaltic Melts and the Composition of Ni-Cu Sulfide Deposits ..... *Michael E. Fleet* 1517
Partitioning of Fe, Co, Ni, and Cu between Sulfide Liquid and Basaltic Melts and the Composition of Ni-Cu Sulfide Deposits—A Reply and Further Discussion ..... *A. J. Naldrett* 1520
Paleoclimatic Control and Stratigraphic Limits of Synsedimentary Mineral Occurrences in Mississippian-Early Pennsylvanian Strata of Eastern Canada—A Discussion ..... *M. J. McLeod* 1529
Paleoclimatic Control and Stratigraphic Limits of Synsedimentary Mineral Occurrences in Mississippian-Early Pennsylvanian Strata of Eastern Canada—A Reply ..... *H. W. van de Pohl* 1530

Reviews

The Mississippi River Delta. Legal-Geomorphologic Evaluation of Historic Shoreline Changes (David Joel Morgan) ..... *Arthur L. Bloom* 1532
Atlas of Economic Mineral Deposits (Colin J. Dixon) ..... *B. J. S.* 1533
Geochemical Exploration 1978. Proceedings of the Seventh International Geochemical Exploration Symposium (J. R. Watterson and P. K. Theobald, eds.) ..... *Herbert E. Hawkes* 1533
Fluvial Sedimentology. Canadian Society of Petroleum Geologists Memoir 5 (Andrew D. Miall, ed.) ..... *George DeVries Klein* 1534
Books Received .. *Michael S. Binder, Jill Dill Pasteris, Kevin Shelton, and Dimitri Sverjensky* 1535
Interesting Papers in Other Journals 1538
Announcements 1541
I.M.A. Commission on Ore Microscopy 1542
Society of Economic Geologists
SEG Distinguished Lecture in Scientific Research: Geochronology and the Archean of the United States ..... *Zell E. Peterman* 1544

Number 7

The Geology and Mineral Resources of Sierra Leone ..... *S. W. Morel* 1563
The Minto Copper Deposit, Yukon Territory: A Metamorphosed Orebody in the Yukon Crystalline Terrane ..... *William N. Pearson and Alan H. Clark* 1577
Some Geothermal Aspects of Polymetallic Massive Sulfide Formation ..... *R. W. Henley and P. Thornley* 1600
Spectra of Altered Rocks in the Visible and Near Infrared .. *Graham R. Hunt and Roger P. Ashley* 1613

Variation in Composition of Chromites from Chromite-Arsenide Deposits in the Periodotites of Malaga, Spain ... *I. S. Oen, C. Kieft, and A. B. Westerhof* 1630
Ore Solution Chemistry VI. PbS Solubility in Bisulfide Solutions to 300°C ... *T. H. Giordano and H. L. Barnes* 1637
The Analysis of Fluid Inclusions by Laser Microprobe ... *Tien-Fung Tsui and Heinrich D. Holland* 1647
Age of Uranium Mineralization in the Gas Hills and Crooks Gap Districts, Wyoming, as Indicated by U-Pb Isotope Apparent Ages ... *Kenneth R. Ludwig* 1654
Multielement Analysis of Natural Waters for Hydrogeochemical Prospecting by X-Ray Fluorescence Following Preconcentration and Filter Deposition ... *A. E. Hubert and T. T. Chao* 1669

Scientific Communications

Autumn Colors, Insects, Plant Disease, and Prospecting ... *Frank C. Canney, Helen L. Cannon, John B. Cathrall, and Keith Robinson* 1673
Metals in Black Shales—A Reassessment ... *Heinrich D. Holland* 1676
The Don Rouyn Mine: An Archean Porphyry Copper Deposit near Noranda, Quebec ... *Raymond Goldie, Brian Kotila, and Douglas Seward* 1680
Exploration for Fluorspar Vein Deposits in Western Kentucky ... *Robert D. Trace* 1684
Observations on a Porphyry Copper Prospect in Choco, Western Colombia ... *Ananda K. Chakrabarti and Jorge Durango M.* 1687

Discussions

Studies of the Base Metal Sulfide Deposits at McArthur River, Northern Territory, Australia: II. The Sulfide-S and Organic-C Relationships of the Concordant Deposits and their Significance—A Discussion ... *K. M. Scott and I. B. Lambert* 1693
Studies of the Base Metal Sulfide Deposits at McArthur River, Northern Territory, Australia: II. The Sulfide-S and Organic-C Relationships of the Concordant Deposits and their Significance—A Reply ... *Neil Williams* 1695
Studies of the Base Metal Sulfide Deposits at McArthur River, Northern Territory, Australia: II. The Sulfide-S and Organic-C Relationships of the Concordant Deposits and their Significance—A Discussion ... *T. Finlow-Bates* 1697
Studies of the Base Metal Sulfide Deposits at McArthur River, Northern Territory, Australia: II. The Sulfide-S and Organic-C Relationships of the Concordant Deposits and their Significance—A Reply ... *Neil Williams* 1699
The Time-Bound Character of Uranium Deposits—A Discussion ... *A. T. M. Mehliss* 1702
The Time-Bound Character of Uranium Deposits—A Reply ... *David S. Robertson, James E. Tilsley, and Glen M. Hogg* 1702

Reviews

Books Received ... *Michael S. Binder, Donald M. Burt, Jill Dill Pasteris, Kevin Shelton, and Dimitri Sverjensky* 1703
Interesting Papers in Other Journals ... 1706
Announcements ... 1719

Number 8

Geologic, Fluid Inclusion, and Stable Isotope Studies of the Tin-Tungsten Deposits of Panasqueira, Portugal ... *William C. Kelly and Robert O. Rye* 1721
The Halite Trend in Hydrothermal Solutions ... *Paul L. Cloke and Stephen E. Kesler* 1823
Environment of Ore Deposition in the Creede Mining District, San Juan Mountains, Colorado: Part IV. Source of Fluids from Oxygen, Hydrogen, and Carbon Isotope Studies ... *Philip M. Bethke and Robert O. Rye* 1832
Gold Deposition in the Baguio Gold District and its Relationship to Regional Geology ... *Henry E. Fernandez and Florian V. Damasco* 1852
Minor Element Geochemistry of the Paragominas Bauxite, Brazil ... *B. I. Kronberg, J. F. Couston, B. Stilianidi Filho, W. S. Fyfe, R. A. Nash, and D. Sugden* 1869

Scientific Communications

Algal Concentration in the Sabi River, Rhodesia: Depositional Model for Witwatersrand Carbon? ... *Andrew Button* 1876

A Borate and Zeolite Occurrence near Magdalena, Sonora, Mexico ..... *Stanley J. Lefond and James M. Barker* 1883

Discussions

Structure of the Broken Hill Mine Area and its Significance for the Genesis of the Orebodies—A Discussion ..... *R. L. Stanton* 1890
Structure of the Broken Hill Mine Area and its Significance for the Genesis of the Orebodies—A Reply ..... *W. P. Laing, R. W. Marjoribanks, and R. W. R. Rutland* 1892
The Flow of Hot Saline Solutions from Vents in the Sea Floor—Some Implications for Exhalative Massive Sulfide and Other Ore Deposits—A Discussion ..... *Hugh Jones* 1894
The Flow of Hot Saline Solutions from Vents in the Sea Floor—Some Implications for Exhalative Massive Sulfide and Other Ore Deposits—A Reply ..... *J. S. Turner and L. B. Gustafson* 1895
Structural Control of Stratiform Deposits with a New Example from Sulitjelma—A Discussion ..... *Georges Pouit* 1895
Structural Control of Stratiform Deposits with a New Example from Sulitjelma—A Reply ..... *Hans Peter Geis* 1896

Reviews

The United States and the Global Struggle for Minerals (Alfred E. Eckes, Jr.) ..... *Charles F. Park, Jr.* 1898
International Molybdenum Encyclopaedia 1877–1978. Volume I, Resources and Production (Alexander Sutulov, Ed.) ..... *Robert G. Blair* 1898
Prospecting in Areas of Glaciated Terrain 1979 ..... *B. J. S.* 1899
Books Received ..... *Michael S. Binder, Paul Merewether, Kevin Shelton, and Dimitri Sverjensky* 1900
Interesting Papers in Other Journals 1904
Society of Economic Geologists 1910
Errata 1911
Index, Volume 74 1913
Contents, Volume 74 iii